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MINES OF INDO-CHINA

BEET SUGAR INDUSTRY OF JAPAN

JAPANESE SILK PRODUCTION

Vol. XIX October, 1923 No. 10

SHANGHAI, PEKING, TOKYO AND MANILA

The Far Eastern Review

ENGINEERING FINANCE COMMERCE

VOL. XIX SHANGHAI, OCTOBER, 1923 No. 10

THE DAWN OF A NEW ERA

A Calamity Turned into a Blessing

By Geo. Bronson Rea

"OUT of the great calamity will come a greater blessing." This sentiment springs from the hope that the day is not far distant when the relations between Japan and America will be so firmly cemented with bonds of sympathy, understanding and business that never again will talk of war in the Pacific be tolerated by the press of either country. Once again, Japan has been called upon to pay the price of peace and good-will. After surrendering every advantage in China and Siberia, conforming to the principles of the consortium and the Washington treaties, restoring Shantung and accepting the limitation of armaments and in many other ways demonstrating her willingness to march in harmony with America; after subjection to a grilling propaganda and disastrous boycott for refusing to relinquish her one remaining strategic position in Manchuria, Japan has been crushed by a calamity which overshadows the losses of the Russo-Japanese war and surpasses any destruction which might have been inflicted upon her by an overwhelming invading army. Whatever may have been the political mistakes of former Japanese cabinets; whatever grudge may have been held by other nations against Japan for her advance in industry and power, the score has been settled in full. Japan lies helpless, shaken to its very foundation by the most appalling catastrophe in the history of the world and in her hour of trial and need turns her eyes eastward over the broad Pacific towards the great nation whose people more than any other has misunderstood and misinterpreted her policies and aspirations, and silently asks for its friendship, trust and co-operation. And before even the need was realized or the hope framed, the response was on its way.

A Little Mother of Old Japan who Lost all, Father, Mother, Husband, Child, facing anew the Struggle for Life from her Refuge in an Old Temple Graveyard

Nothing, not even the wholesome clarifying of the atmosphere and frank exchange of views at the Washington conference has so moved and convinced the people and the government of Japan of American sincerity, friendliness and good-will as the spontaneous and immediate measures which sent a score of deep-laden relief ships hurrying from China, from Manila and the Pacific coast to succor the victims of the great calamity. In a vague, remote way, the people of Japan had heard about American relief work in France, in Russia and the Near East; they had more accurate information about the millions poured into China to succor the famine and flood sufferers, but never in their wildest imagination could they conceive that those whom they had been taught for years to look upon as the imaginary enemies of their country and race, would respond in the same generous spirit to any urgent need for relief where they were personally concerned.

And when the earth heaved and rocked, dancing to the tune of death played by the mighty subterranen forces and their flimsy structures came tumbling down like houses of cardboard, burying thousands in the ruins, and the fire demon licked clean the *débris*, wiping out the whole of Yokohama and over half of Tokyo, piling up the dead by heaps and rows in the streets and by thousands in the open places when they had taken refuge; when over two million people suddenly found themselves homeless, destitute, hungry and heart-broken with sorrow and despair; the first foreign ships to come rushing in with food, clothing, tents, medicines, nurses and doctors, flew the flag of the United States of America.

Shell-shocked, dazed and dumb with the horror of the first three days, the survivors of the quake at Yokohama saw on the evening of the third of September a streak of fire flaming towards the harbor from the south. Speeding in at a thirty knot clip, with her funnels glowing red, the American destroyer *Stewart* slowed up and came to anchor off the ruins of the breakwater, the first foreign relief ship to arrive on the scene, the vanguard of the fleet loading supplies in the various ports of the Far East for the victims of the catastrophe. The American navy was on the job from the minute the first news was received at Dairen. Had war with with Japan been declared it could not have operated with greater dispatch. The opportunity had arrived to show the Japanese people the real friendliness of America and the navy swung into action moved by a common impulse to render immediate aid and

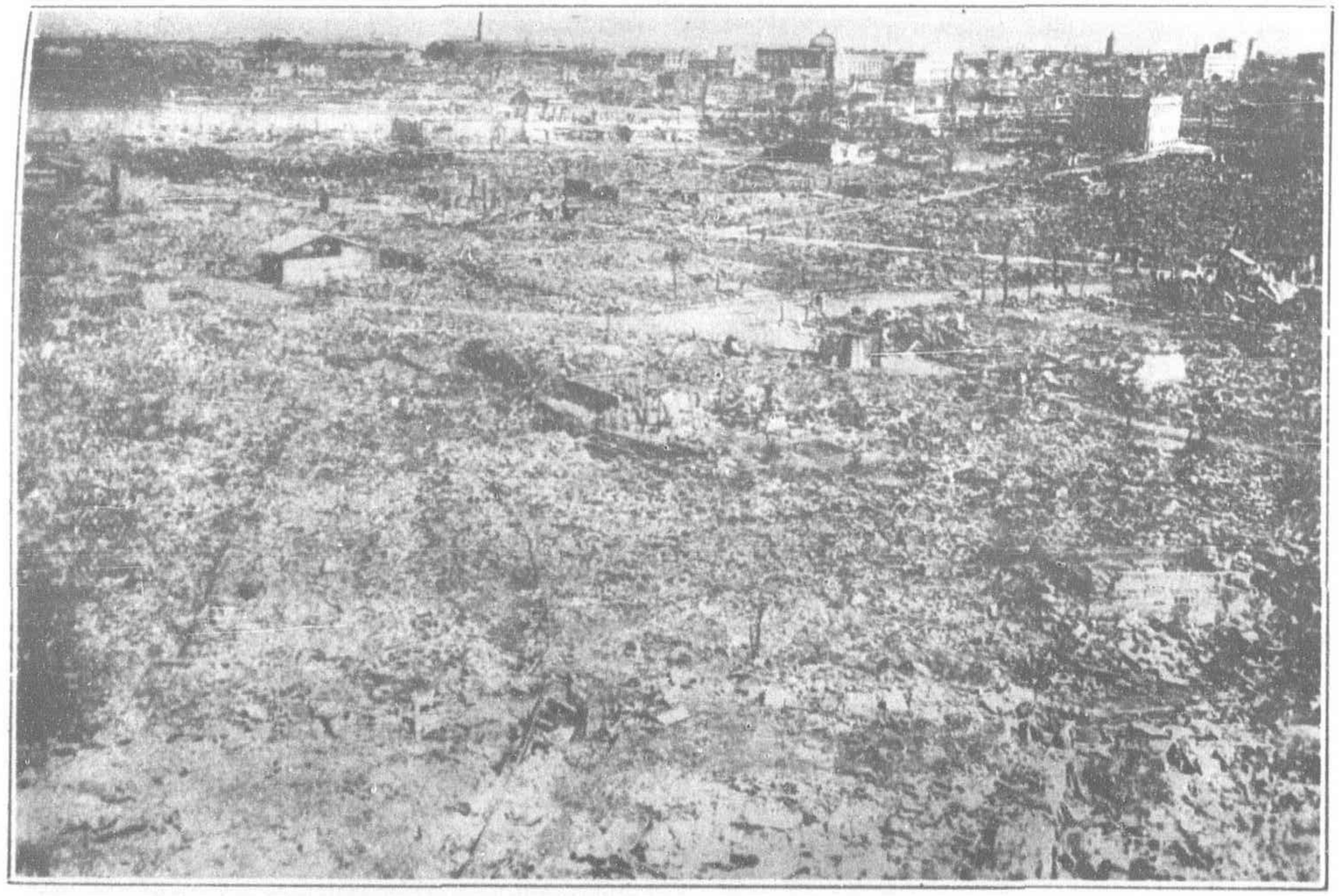
The Prince Regent of Japan receives the Report of the Disaster from Baron Goto in Uyeno Park

comfort. At ten o'clock Sunday morning, the news of the disaster reached Dairen. The *Huron*, flagship of the American Asiatic fleet, the supply ship *Black Hawk* and the 38th destroyer division were lying in the harbor under command of the chief of staff, Captain Stearns. The admiral was at Chefoo, the summer rendezvous of the fleet, a hundred miles away across the Chihli Gulf. Captain Stearn in company with Consul Ballentyne was starting out to pay an official call on Baron Ijuin, governor-general of Kwantung, when he learned the news. Issuing orders to have steam up and ready for immediate departure, he hastened to meet the governor-general and placed the American Asiatic fleet unconditionally at the service of the Japanese government. By three o'clock the *Stewart* was steaming at full speed towards Yokohama with orders to keep the admiral informed of the extent of the disaster and the nature of such supplies as would be most urgently needed. The fleet picked up the admiral at Chefoo, who ordered the *Black Hawk* to Tsingtao to load supplies and wirelessed every naval supply ship in the Far East to do likewise. The naval purchasing officers at Manila, Shanghai and elsewhere were authorized to purchase everything that could be readily procured on the local markets. The 38th destroyer division followed the *Stewart* within twenty-four hours and the 45th division at Chinwangtao, was ordered to join the flagship already under full steam headed for Yokohama. Admiral Anderson assumed full responsibility. Red tape disappeared. Without awaiting instructions from Washington he compromised the navy department to an expenditure of over two and a half million dollars, and then informed the secretary of the navy what had been done. The answer came congratulating him, approving his action and authorizing him to go the limit. It was not until relief from other sources was on its way and after the first emergency had been adequately met, that this order was revoked. By that time, the other branches of the government and the Red Cross had relieved the navy of the load. On the fifth, the 38th destroyer division steamed into Yokohama, followed by the flagship on the 8th and by the 45th division on the 9th. On the 11th, the *Black Hawk* loaded to the plimsol mark with a full cargo of food and other necessities came in from Tsingtao, followed by the mine-layer *Bittern* with tents, clothing and miscellaneous stores. The *Pecos*, the *Aberenda* and the *Vega* had answered the S.O.S. call of the admiral and followed each other into Yokohama from Manila, from the Yangtze and from far off San Francisco loaded down with urgent supplies. The destroyers were placed at the disposition of the Japanese government. Some were employed in conveying refugees from Yokohama to Shimidzu, others made special trips to Kobe and back for the Japanese and in other ways contributed their full share in establishing communications and succoring the unfortunate victims of the earthquake. The navy established a new record, one that the country may well be proud of.

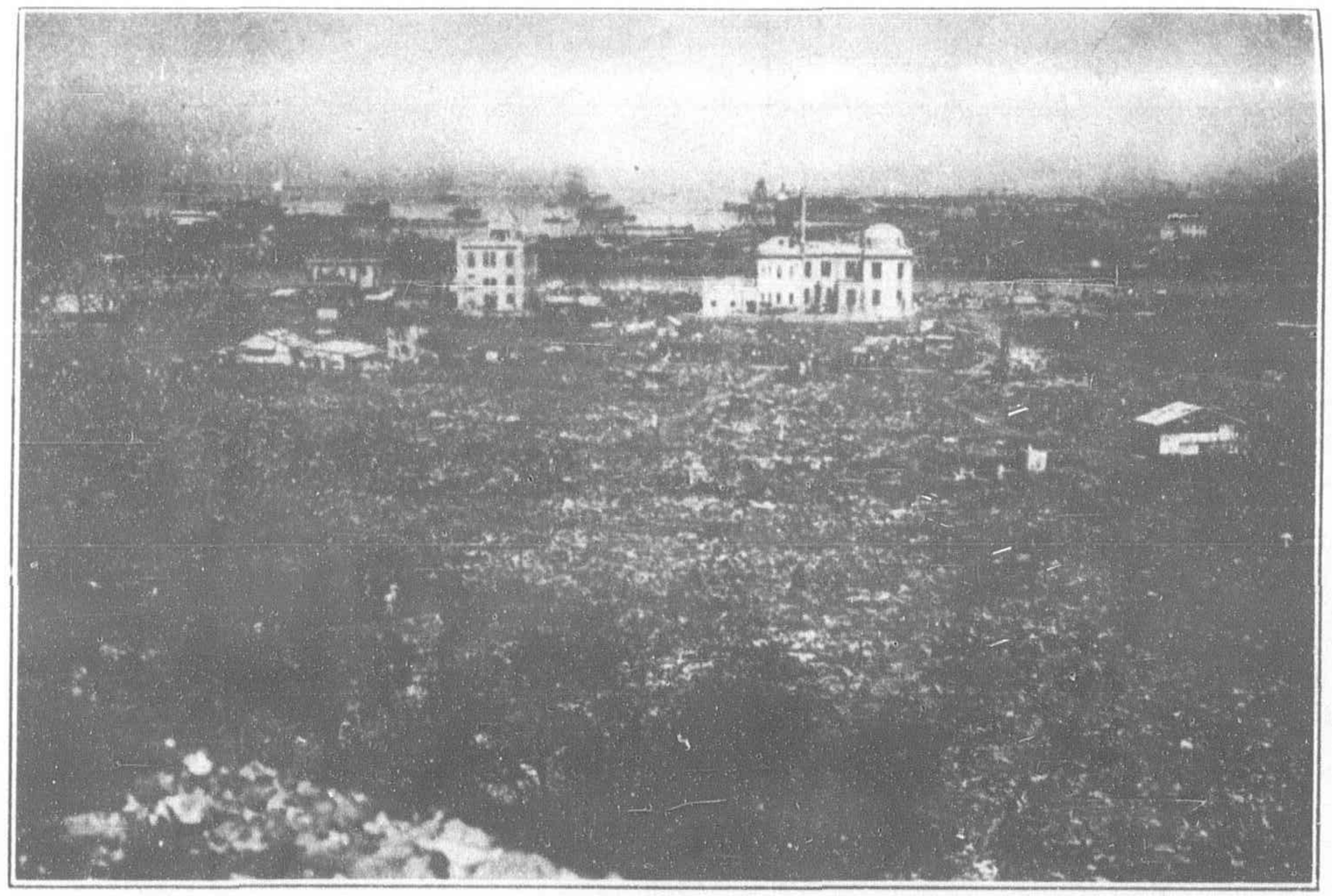
Following close on the heels of the navy came the army transport *Merritt* hastily loaded at Manila with 800 tons of food, a complete field hospital and 1,200 tons of medical supplies; the navy tender *Pecos* also from Manila, followed three days later with 1,000 tons of food, then the army transport *Meigs* appeared with nearly 4,000 tons and 20,000 cans of food, 3,000 cases of milk, 30,000 suits of clothing, 2,500 tents, 12,000 blankets, 15,000 cots, medical supplies for 150,000 people for two months, 67,000-ft. of lumber, water carts, rolling kitchens, another complete field and evacuation hospital and 23 doctors and nurses. Then came the navy supply ship *Aberenda* with 4,000-lbs. of fish and a full cargo of various foodstuffs. On the 26th, arrived the great army transport *Somme* from San Francisco with another base hospital, 104 in-

The Prince Regent and his Escort of the Imperial Guards passing through Uyeno Park

THE DESOLATION THAT WAS YOKOHAMA

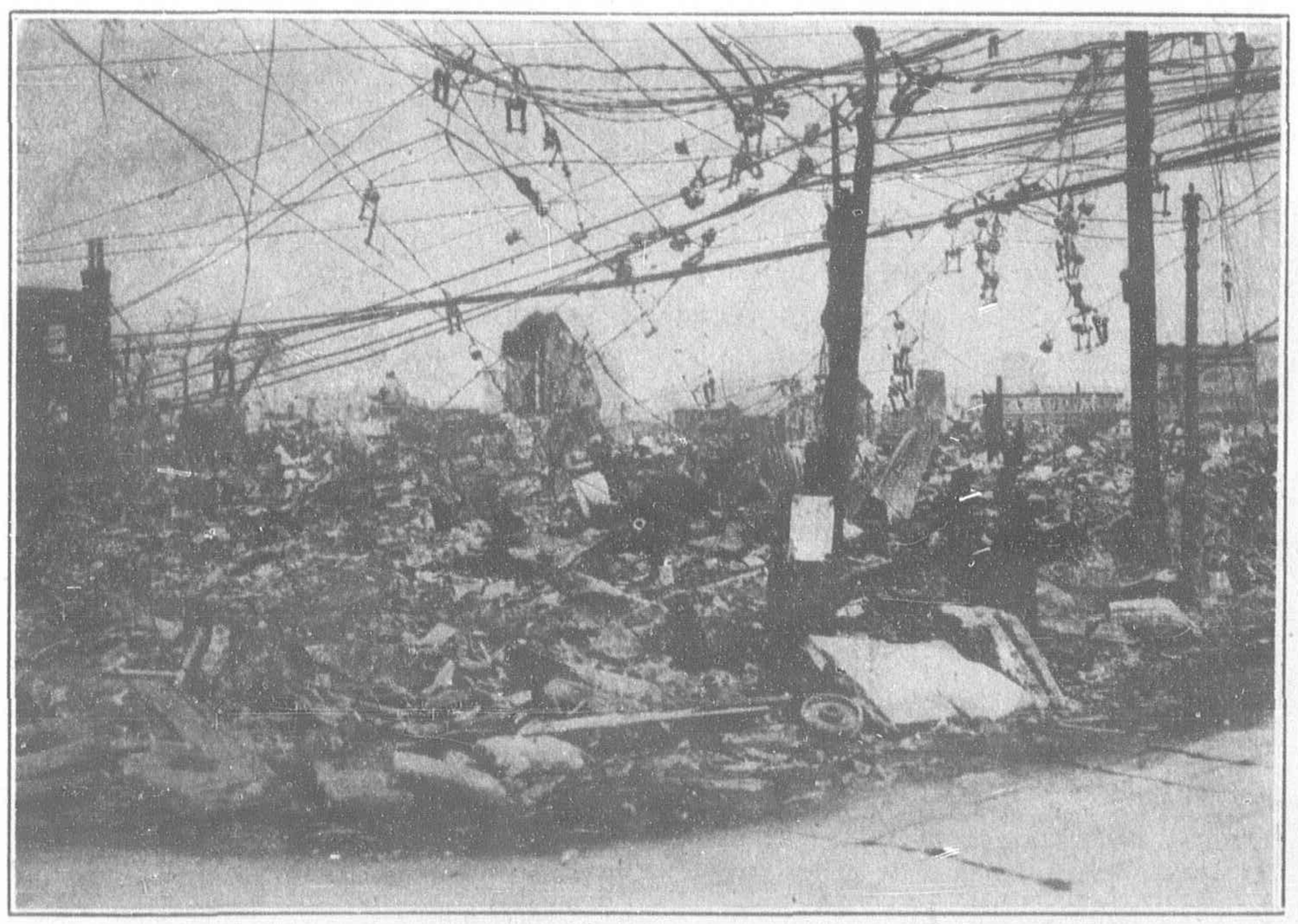


Looking toward the centre of Yokohama from the north-west



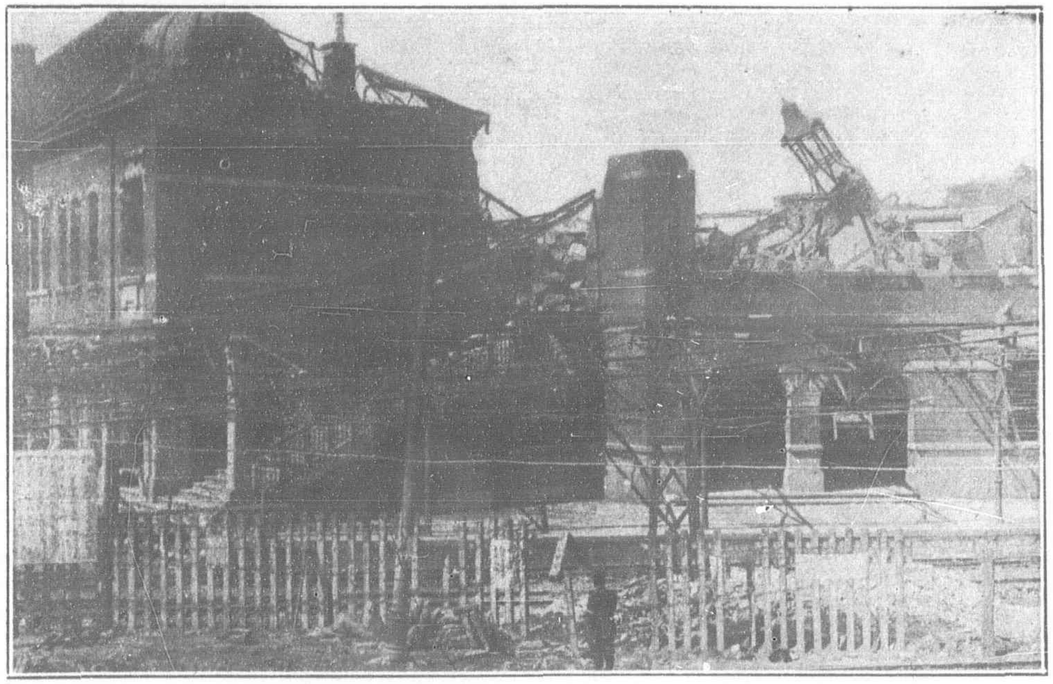
View from Kanagawa: Municipal Social Hall in centre now operated as a hospital by the South Manchuria Railway Company

A Bird's-eye View of Yokohama: two days after the disaster. Shacks and shelters appear on the still smoking ruins



Another view of the wreckage that was once the proud commercial port of Japan

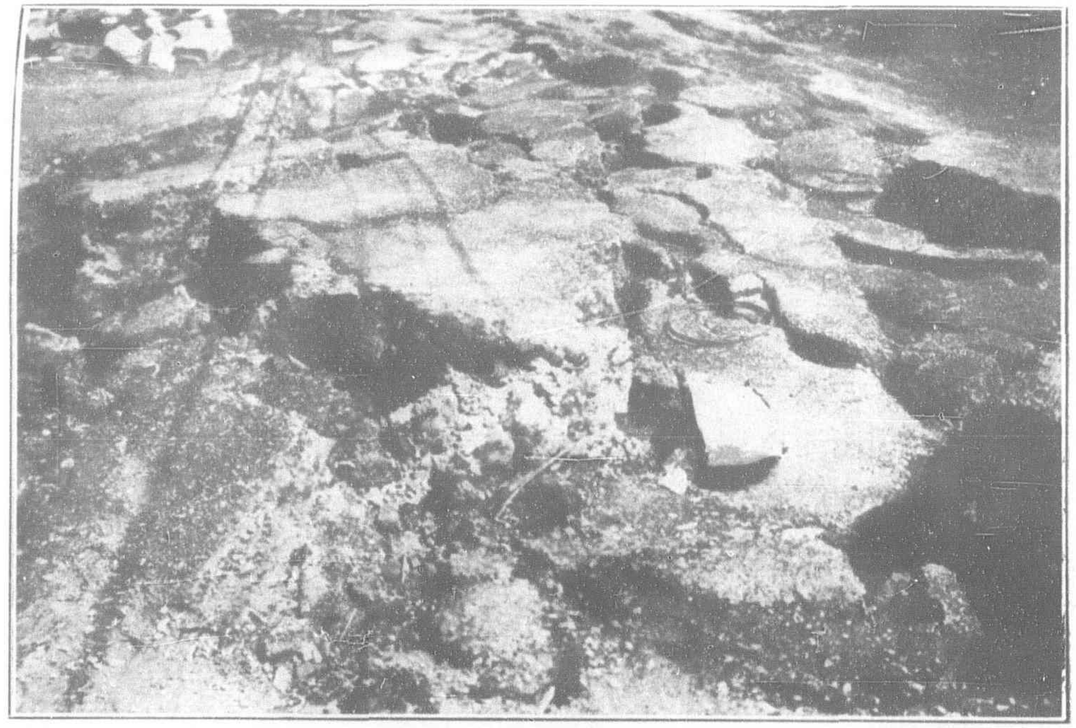
Ruins of the Yokohama Specie Bank a Yokohama. Over two hundred people, who flocked to this edifice for safety, were burned to death when the flames enveloped and gutted this splendid structure. Heaps of dead were banked against its outside doors where they were appealing for entrance inside. The saddest spectacle in Yokohama



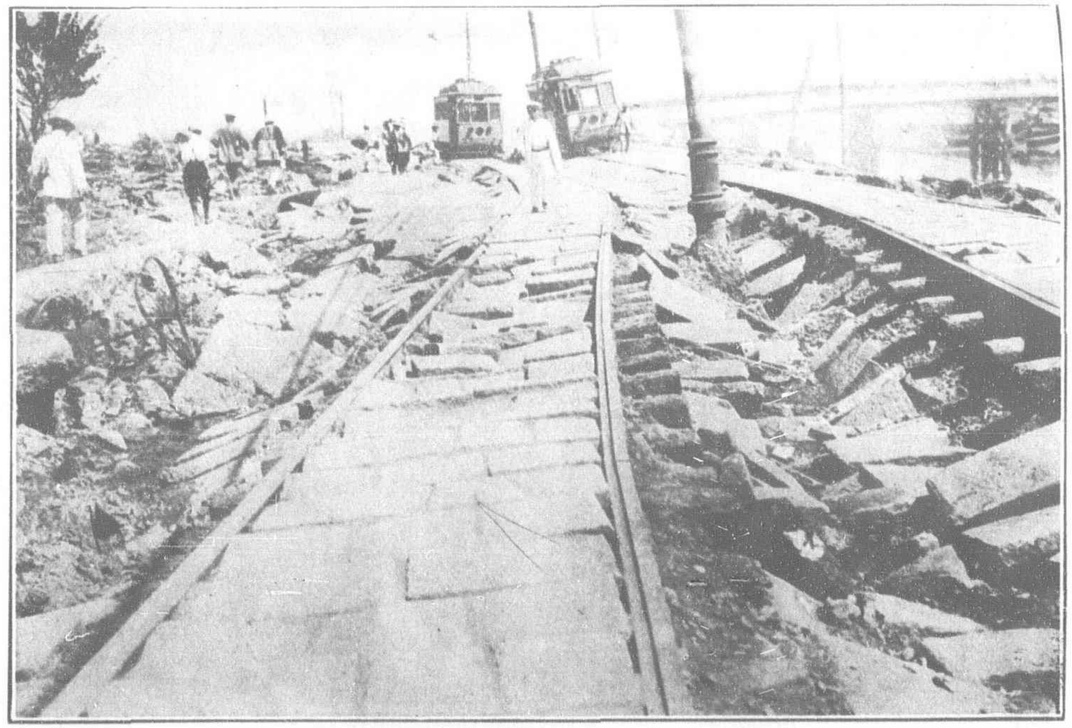
The Imperial Japanese Government Railway Station at Yokohama gutted by fire

Customs House, Yokohama

The ruins of the Pier at Yokohama

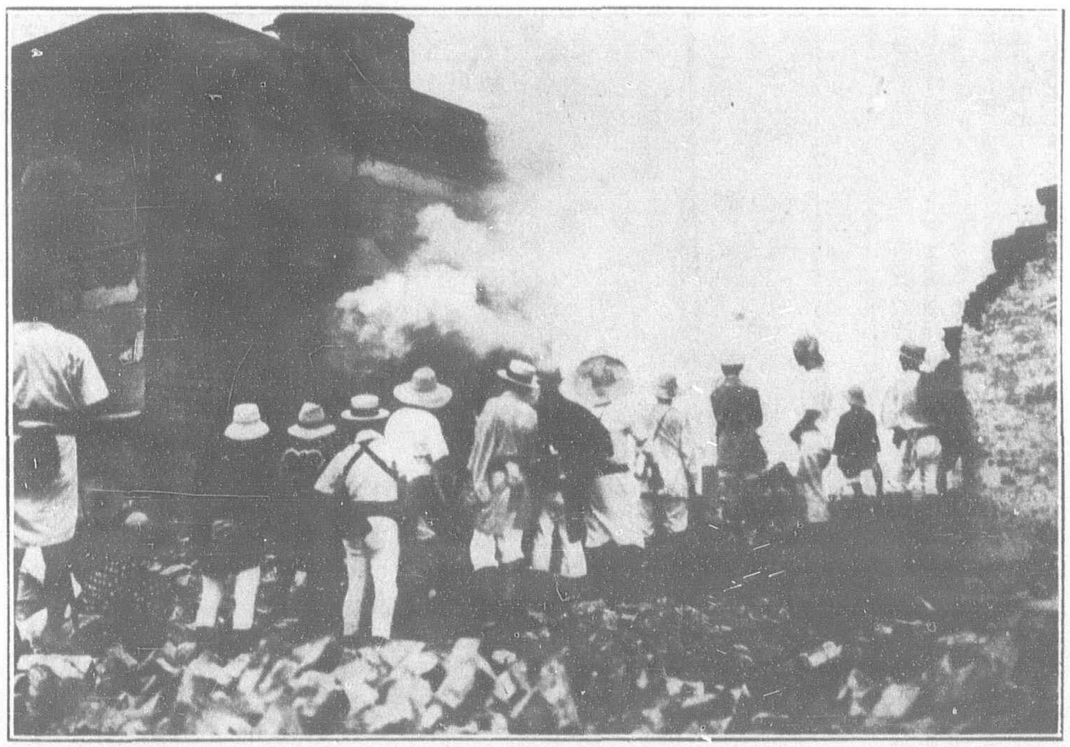


Earth cracks at Yokohama



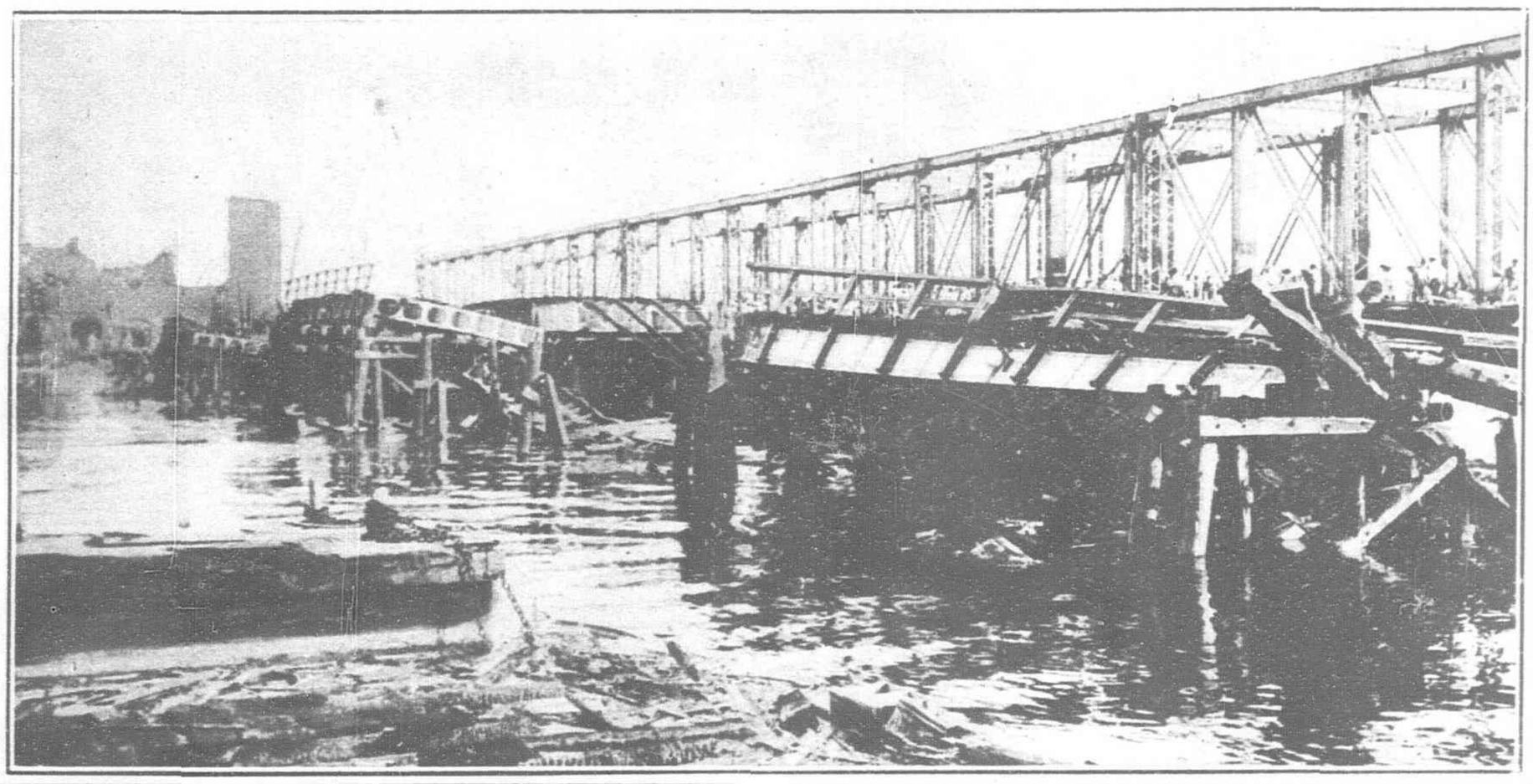
What the quake did to the tramway at Yokohama

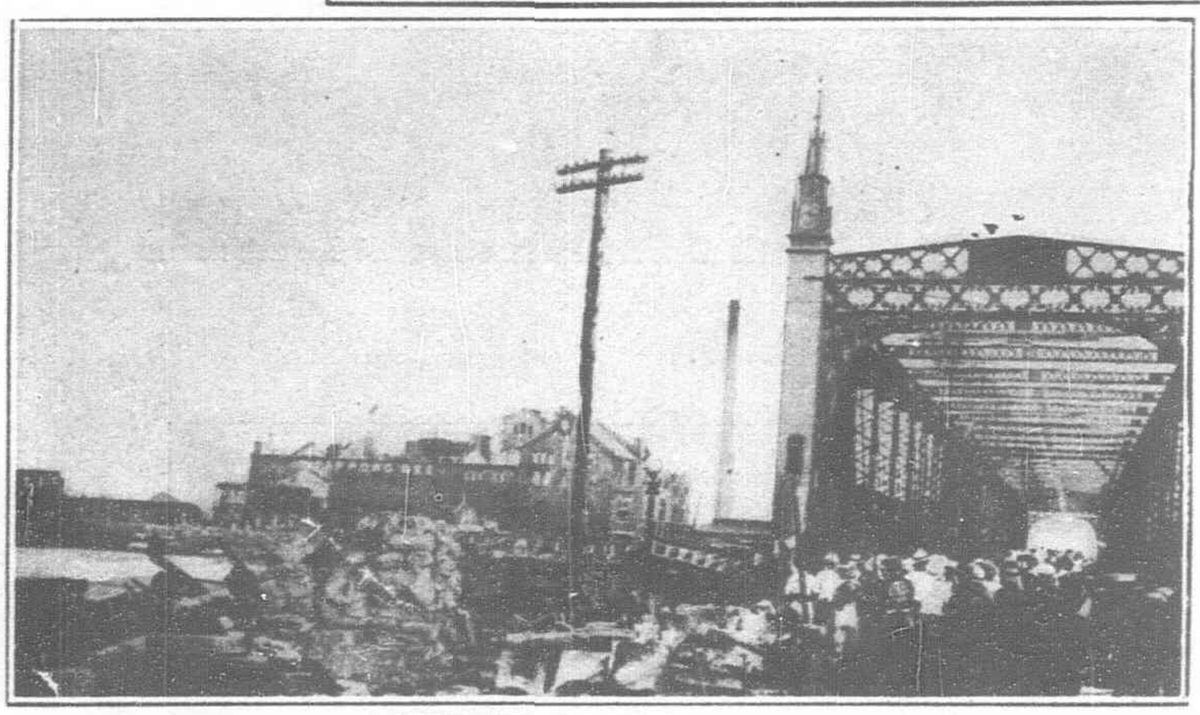
Refugees fleeing from Yokohama

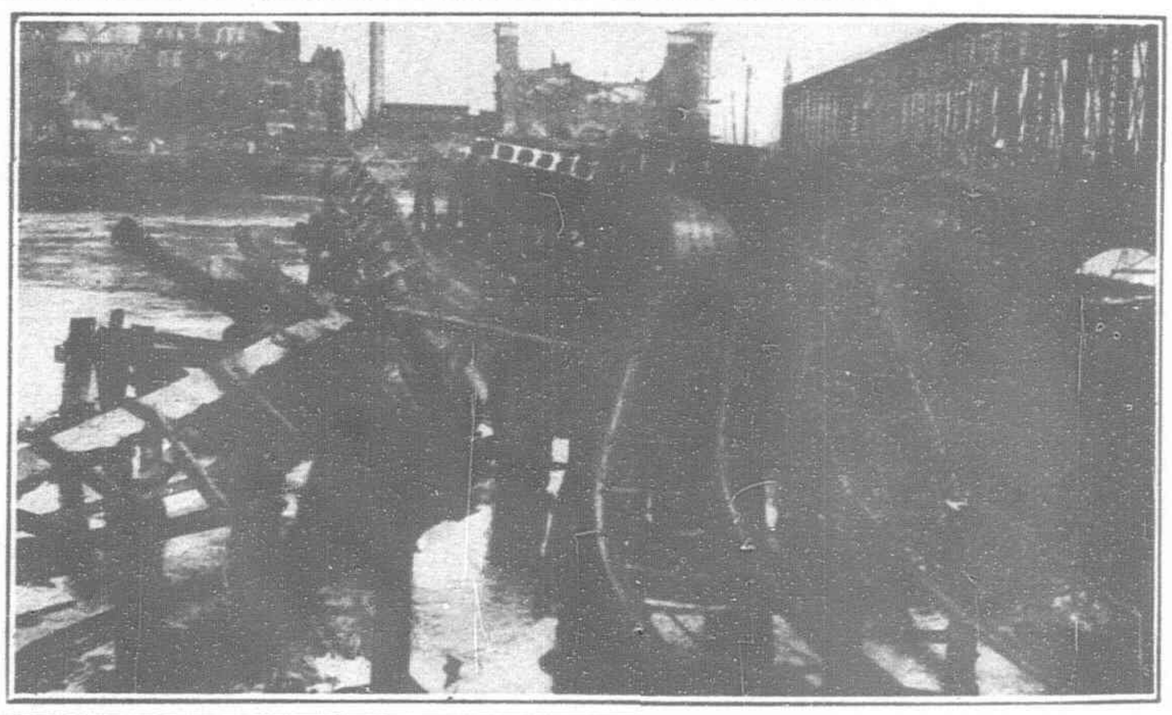


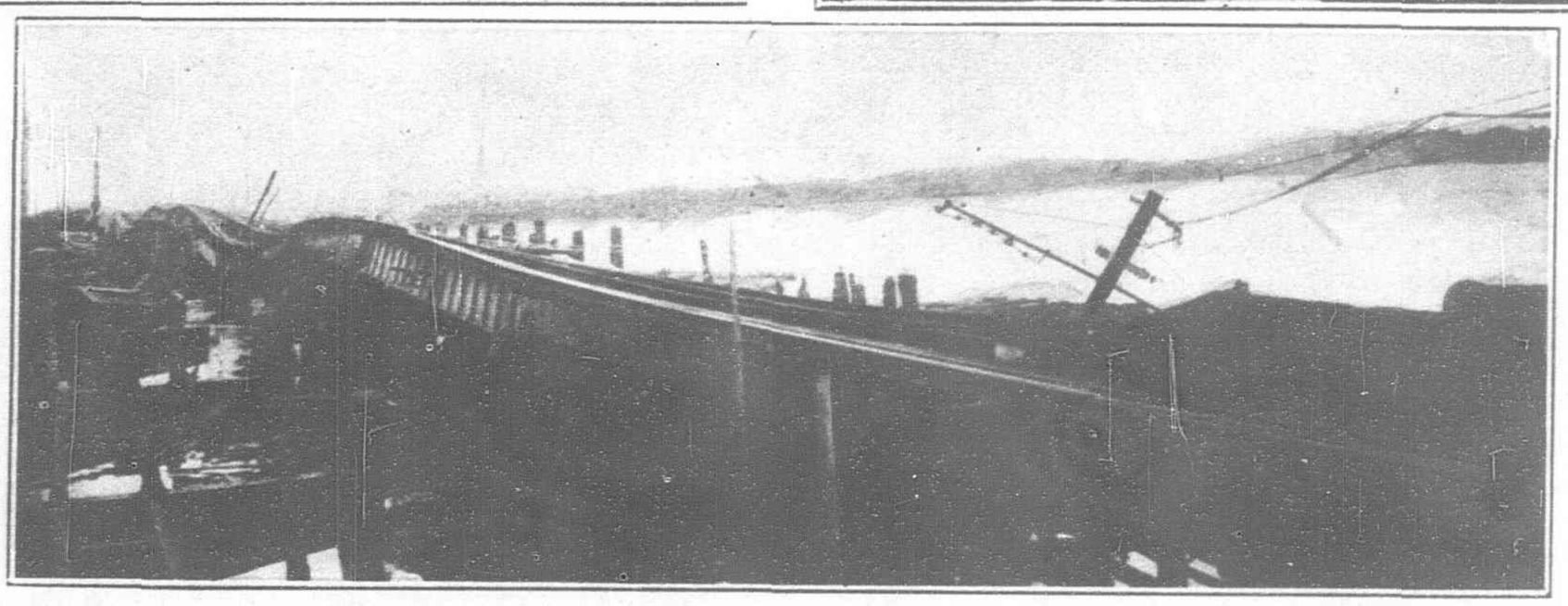
Many of the old Japanese fire-proof storage houses with heavy iron doors and shutters stood the quake and resisted the flames. The photo shows one being opened with clouds of smoke rolling out, the contents having been baked and scorched by the terrific heat

firmaries complete with 3,200 tons of medical stores, about 15,000 tents of all sizes (in addition to the hospital tentage) 6,000 extra cots and at least 2,000 tons of food. Behind this vanguard plowing their way across the Pacific from Seattle are following the Blue Funnel freighter *Tyn Dareos* with 500 cases of salmon, 1,000 cases of milk, 200 tons of flour, 6 tons of hard tack and five tons of drugs; the *Congosan Maru* with 25 tons of rice, 300 tons salt fish, clothing, blankets and 28 tons of galvanized iron roofing; the *Toyama Maru* with 50 tons rice, 10,000 cases of salmon, 500 cases of milk, 500 tons of flour, 20 tons of hard tack and 100 tarpaulins; the *President Jackson* with 3,000 cases of evaporated cream, 100 tons of flour; the *Yomei Maru* with 200 tons of galvanized iron roofing; the *Tempaisen Maru* with 150 tons of roofing; the *Iyo Maru* with 100 tons of fish, 150 tons of evaporated cream, 50 tons of flour; the *President Jefferson* with 150 tons of roofing and the *West Henshaw* with 54,500,000-ft. of lumber and 5,000,000 shingles; from Portland comes the *Dewey* with 4,500,000-ft. of lumber; from San Francisco, the navy supply ship *Vega* with 5,000 tons of rice, 1,000 tons of salmon, 100 tons of evaporated cream, 1,000 tons of flour, 200,000 drawers and 150,000 undershirts, 100,000 blankets and 100 tons of roofing; the *President Taft* had 300 tons of rice; the *Fusan Maru* from Seattle had 60 tons of rice, 375 tons of meat and fish, 20 tons of milk, 600 tons of flour, 50 tons of hardtack, 6 tons of tentage. This was only the beginning, the stores readily obtainable in the local markets. Manila depleted its supplies to the minimum margin of safety; Seattle was drawn upon to its limit and now from the East are coming the main Red Cross shipments. All this was spontaneous, the immediate reaction of America to the needs of the situation without consultation with the Japanese authorities. At the same time the American Red







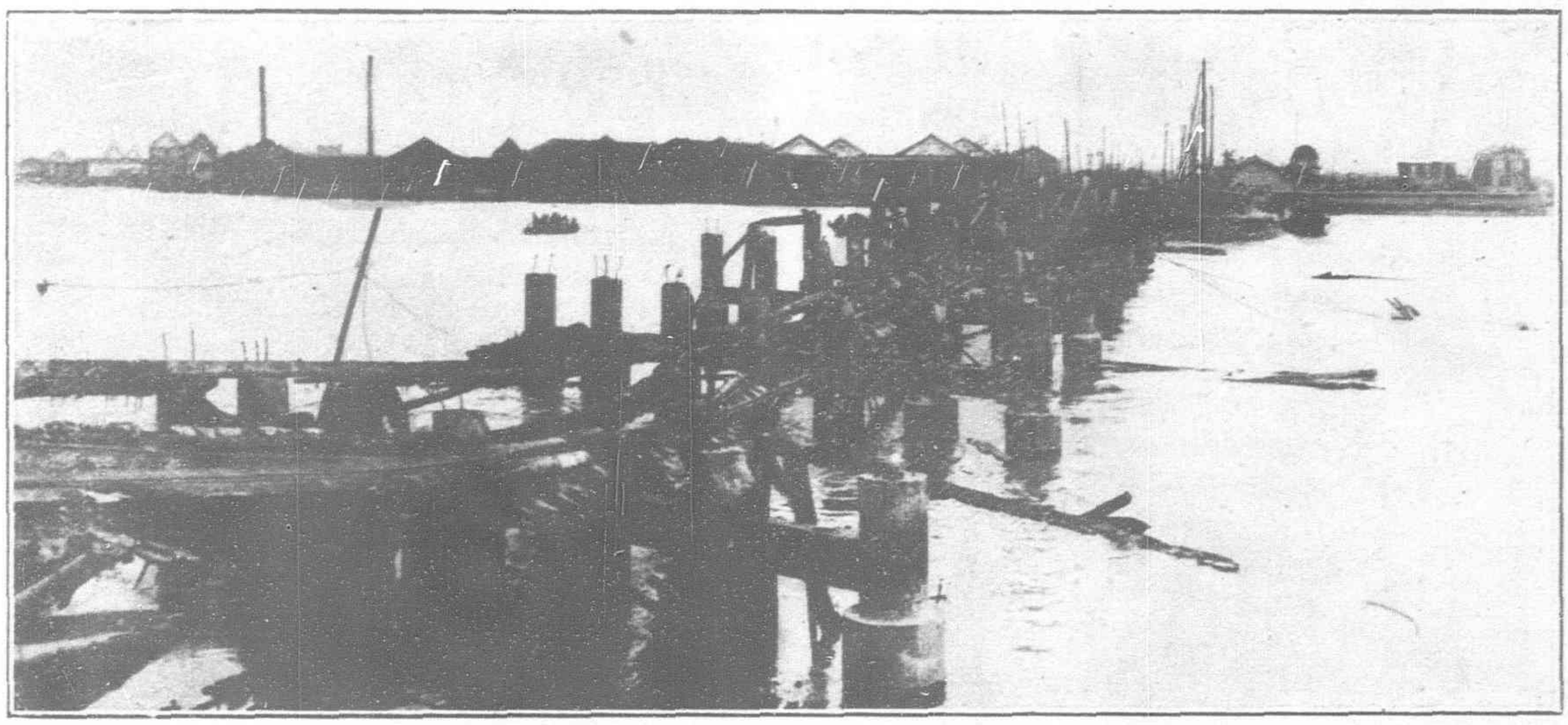


THE AZUMA-BASHI (BRIDGE) OVER THE SUMIDA RIVER,

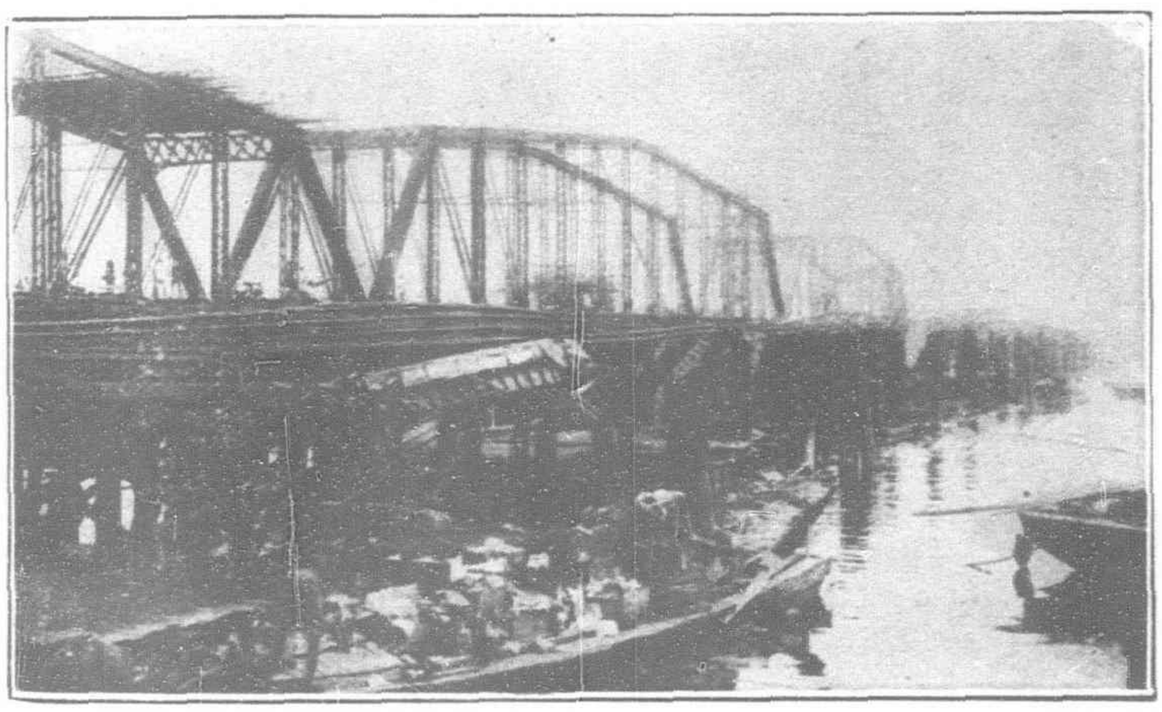
Connecting the Asakusa and Honjo districts of Tokyo. The large building on the left in Honjo is the Sapporo Beer Brewery, gutted by fire.

The main steel structure stood the quake, but the old bridge on pile foundations carrying the railway and water pipes was shaken into an unrecognizable mass of ruins.

Cross Society issued its call for relief funds and within a few days over $8,000,000 was contributed from all parts of the United States. (The latest report states that the American Red Cross contributions have reached a total of $19,000,000). The navy had spent nearly $3,000,000, another $1,000,000 was cabled by the government to General Wood at Manila, the Philippine authorities set aside a special fund for relief, the American Red Cross chapters in China rushed over a complete hospital unit, while the army transports and naval supply ships freighted cargoes without charge. To such an extent did food supplies come rushing in that the Japanese authorities early requested that they be discontinued, and clothing, blankets, tents and building material sent in order to prepare against the severe winter weather. It took some time to ascertain the full extent of the calamity, the number of dead and wounded, the missing, the homeless and destitute and draw up an intelligent requisition for necessary relief supplies. The following graphic dispatch sent by Ambassador Woods to the secretary of state for the information of the Red Cross Society tells its own story: "The Japanese earthquake relief bureau officially reports four provinces so devastated that over two million people are homeless and destitute, dependent solely upon government support or outside assistance for shelter, clothing and subsistence during the approaching

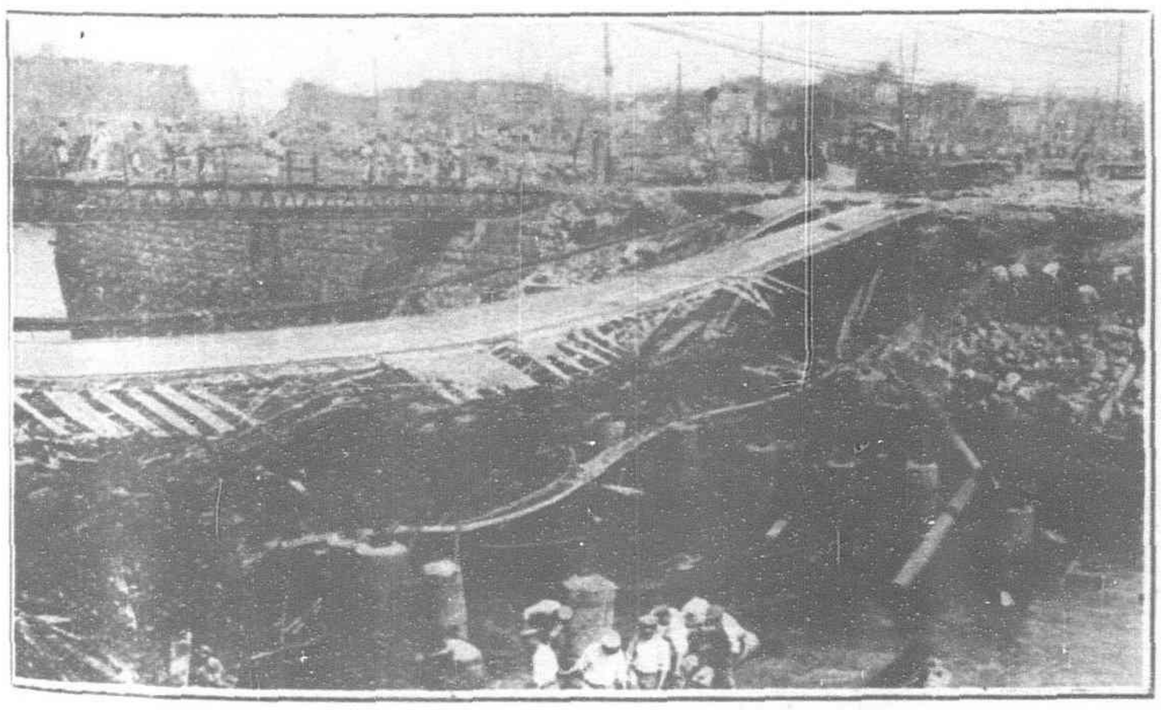


Ruins of the wooden bridge connecting Fukagawa ward of Tokyo with the Tsukishima Island; nothing left but the reinforced concrete piles and twisted rails and pipes

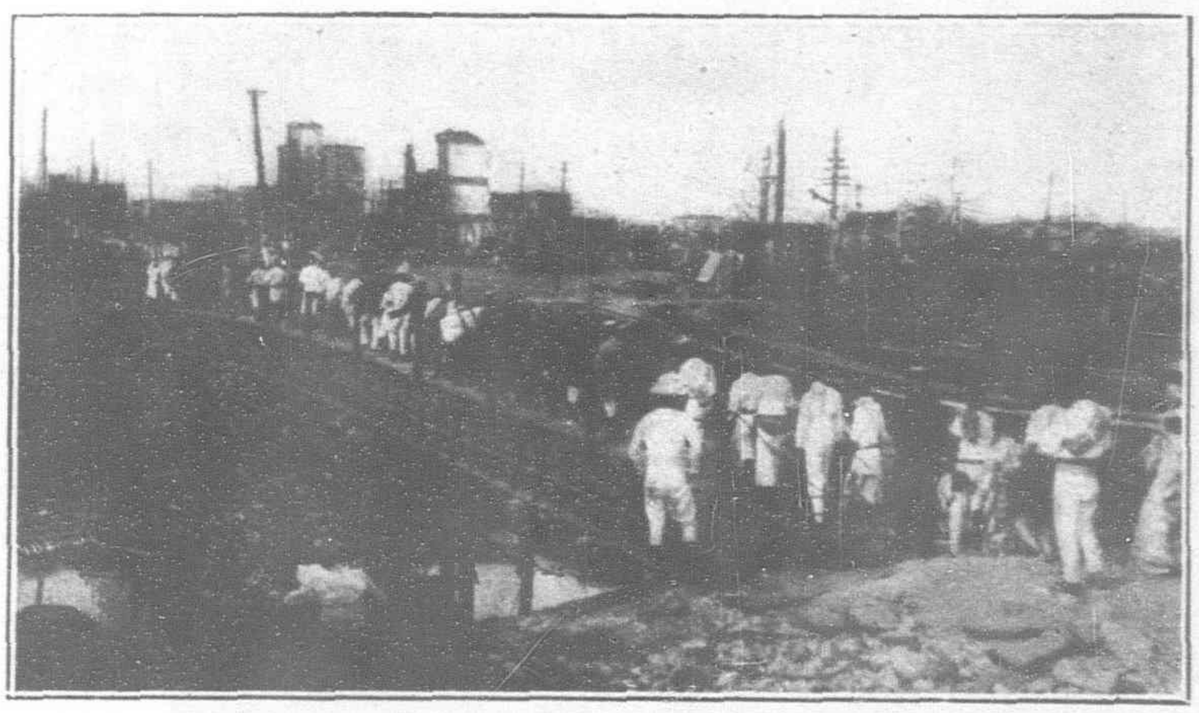


The Eitaibashi bridge over the Sumida River, connecting the Eitaibashi district with Fukagawa. The wooden floor of the new structure was licked up by the flames which devored the old wooden pile bridge in the foreground

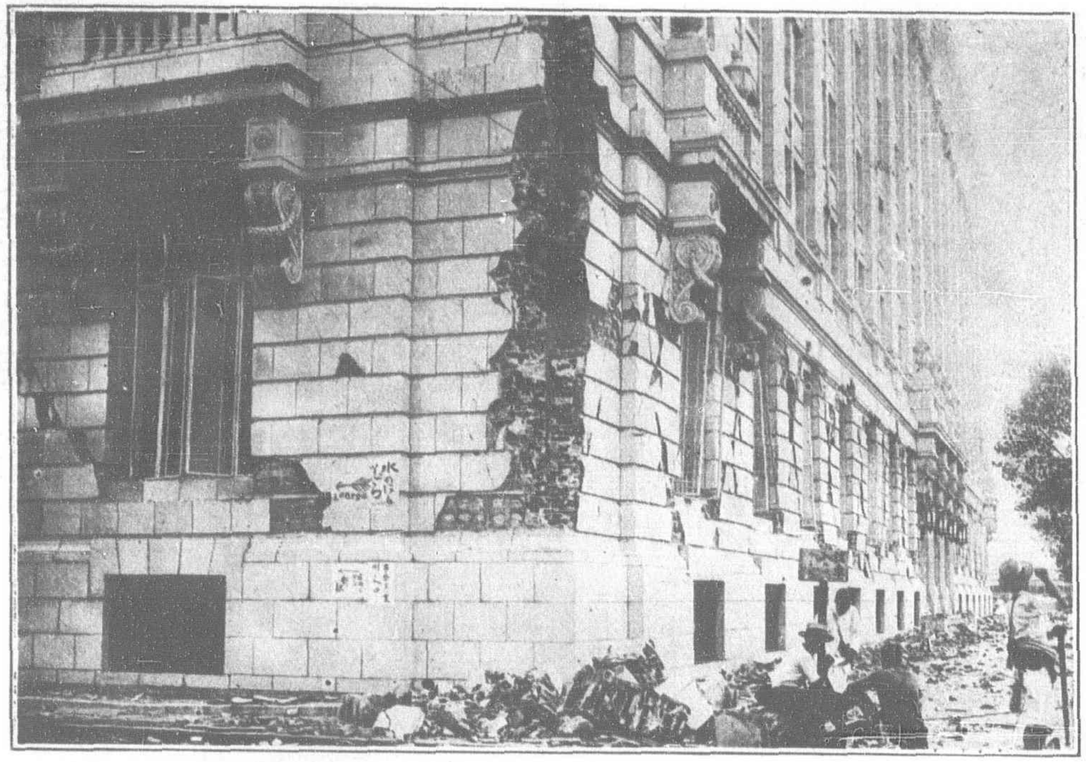
The Ryogokubashi bridge over the Sumida



Ruins of the Kanda Bashi bridge

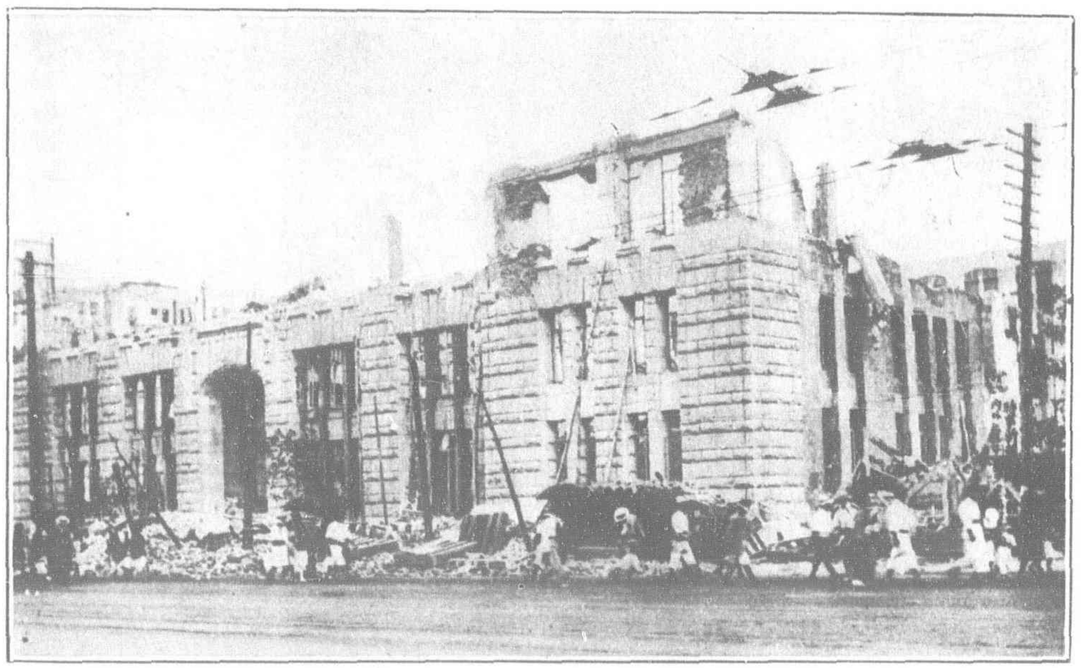


Pedestrians crossing the Kanda Canal on the water pipe



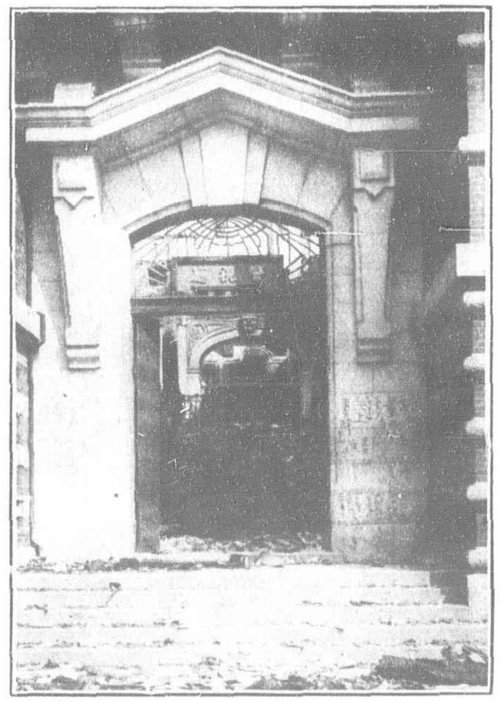
How the magnificent new Nippon Yusen Kaisha Head Office in Tokyo stood the quake. This is one of the three modern steel frame edifices erected by the Fuller Construction Company. The damage was superficial, confined largely to splitting and shaking loose the hollow terra cotta tile facing in imitation of granite. The facing on the lower stories suffered most, which at each corner the brick and hollow tiles were shaken out.

Ruins of the 12-storey Pagoda in Akasaka Park.



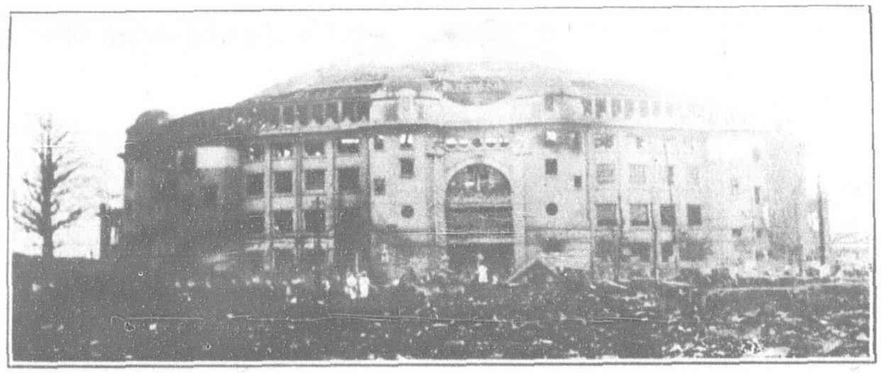
Ruins of the Nagai Office Building on Babasaki, near the new N.Y K. Building.

This is new six-storey reinforced concrete building under construction at the time of the quake with gave way and caved in from all sides towards the centre. Pillars, beams and floors of reinforced concrete were broken up, burying over thirty workmen under the mass of *débris* which fills the interior up to the second storey.



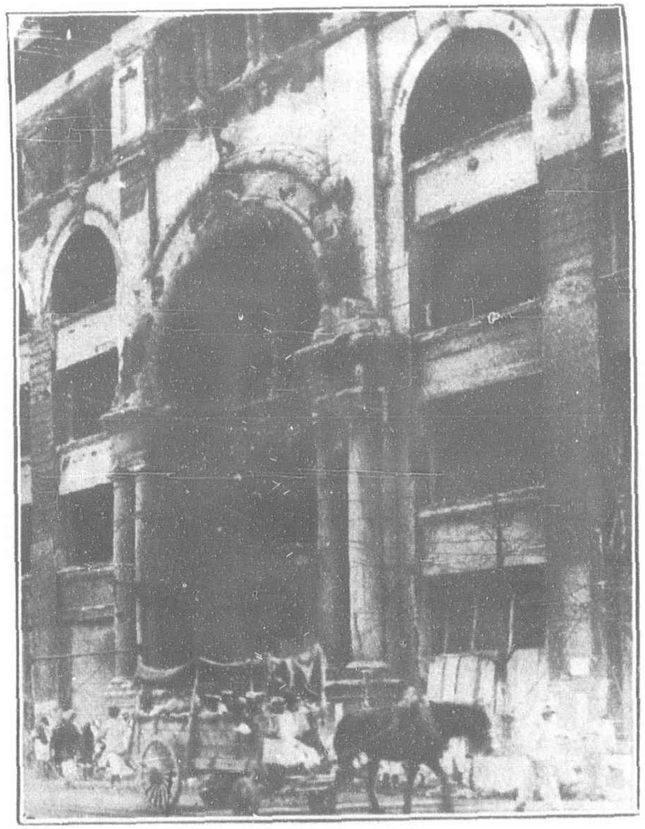
Entrance to the Metropolitan Police Headquarters at Babasakimon. The building stood the quake but was gutted clean by the fire.

The beautiful new Tokyo Kaikan, or Palace Hotel, had the entire second tier of bricks shaken out, throwing all the weight of the quivering building on to the steel columns of the frame work, bending them to an angle of at least five degrees. The building will have to be demolished.

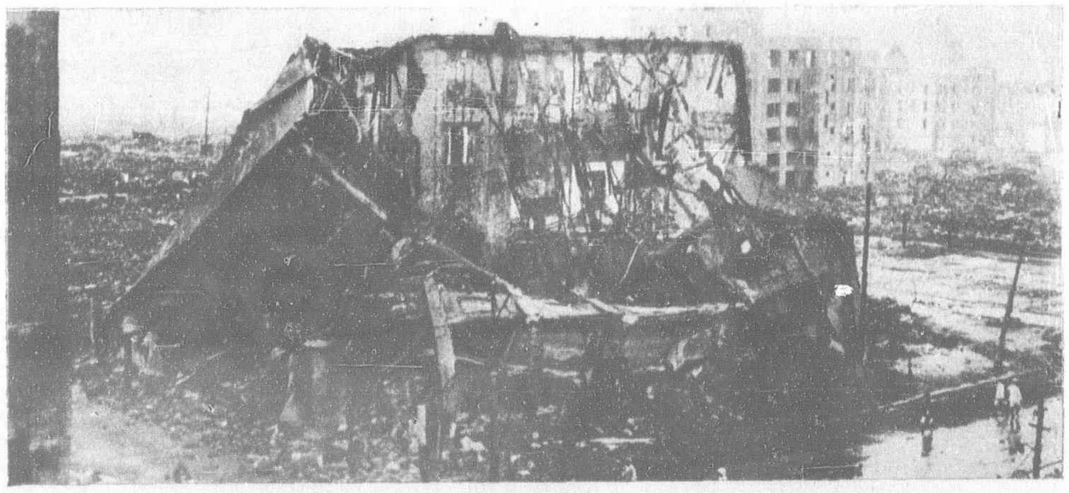


The Kokugikan, or Great Wrestling Hall in Honjo. A magnificent steel concrete and stone structure surviving the quake to be gutted by flames.

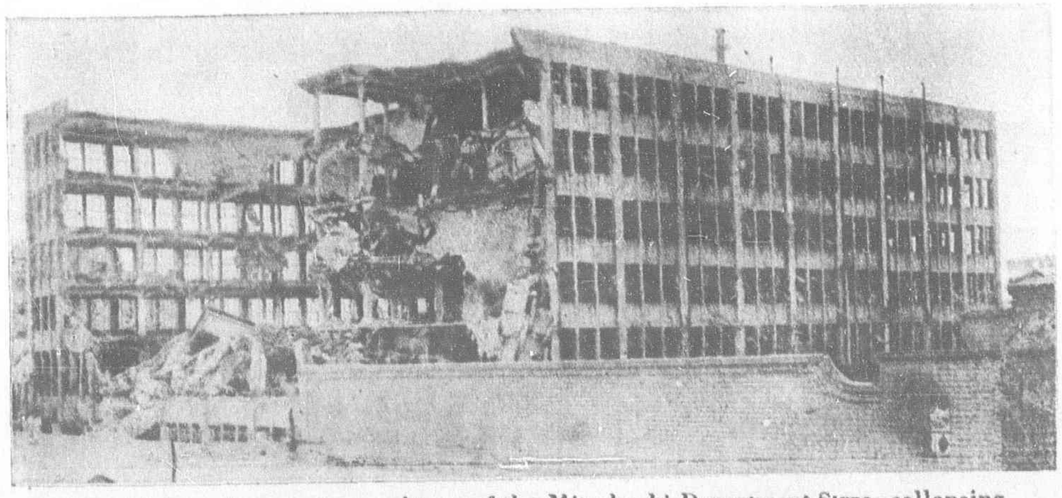
The Mitsukoshi Department Store seared by the intense heat of the conflagration



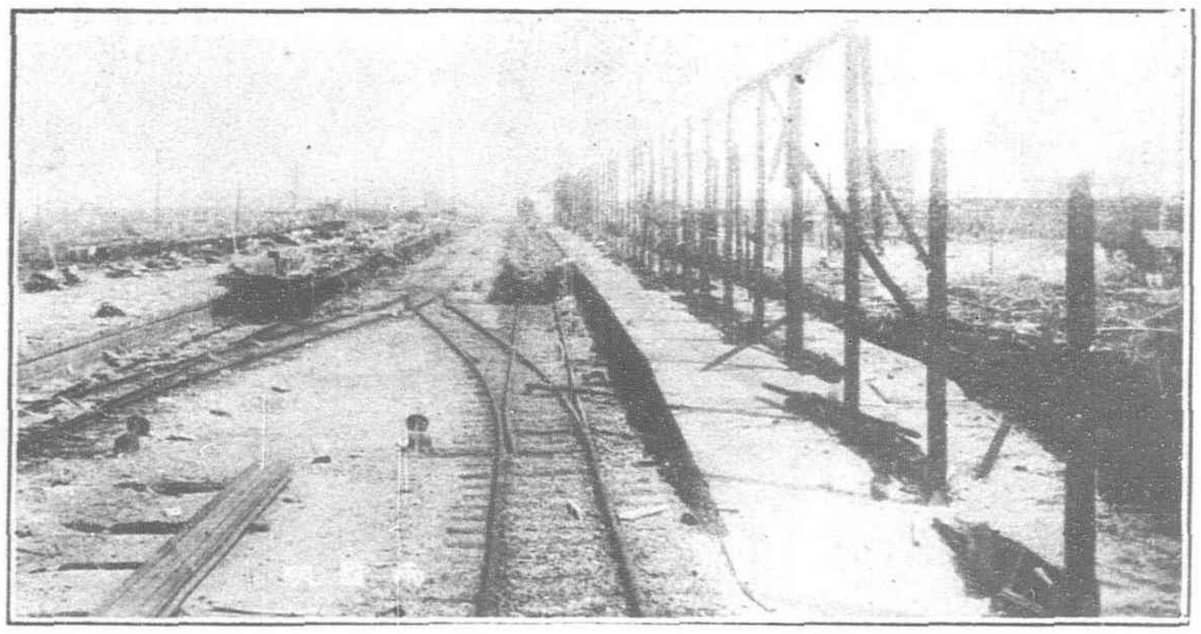
The facade of the great Mitsukoshi Department Store operated by the Mitsui interests. The flames swept clean the interior with its huge accumulation of merchandise, the heat cracking and peeling the granite and limestone facings like paper.



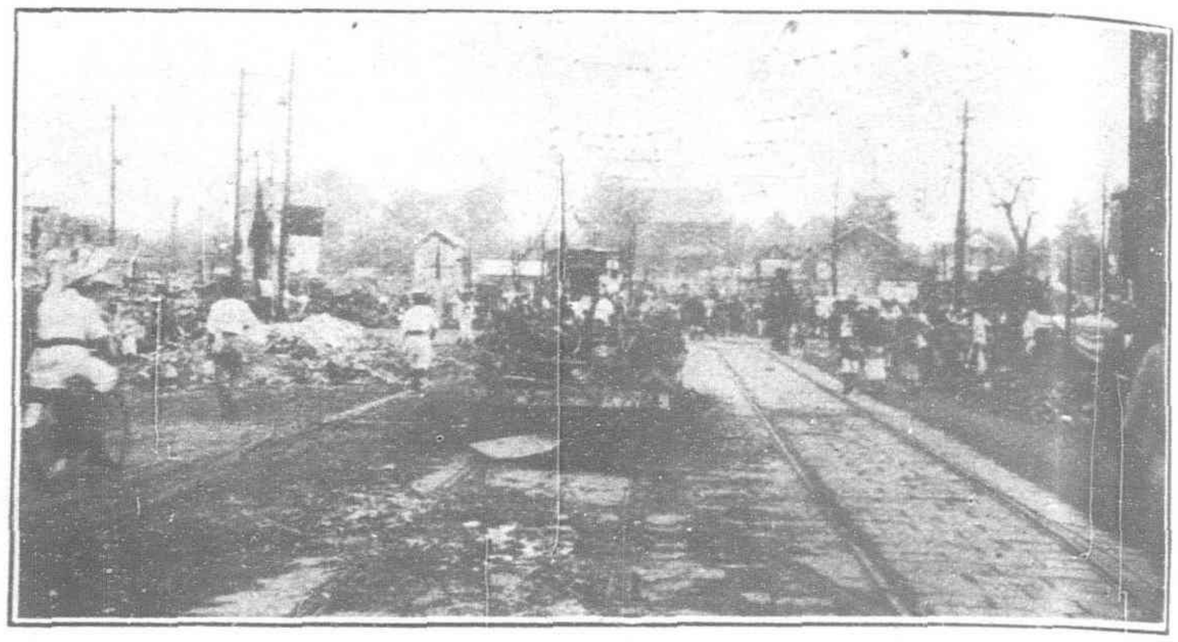
The collapsed Maruzen Building on the Ginza, A brick structure with iron beams and pillars which collapsed with the quake and licked clean by the fire.



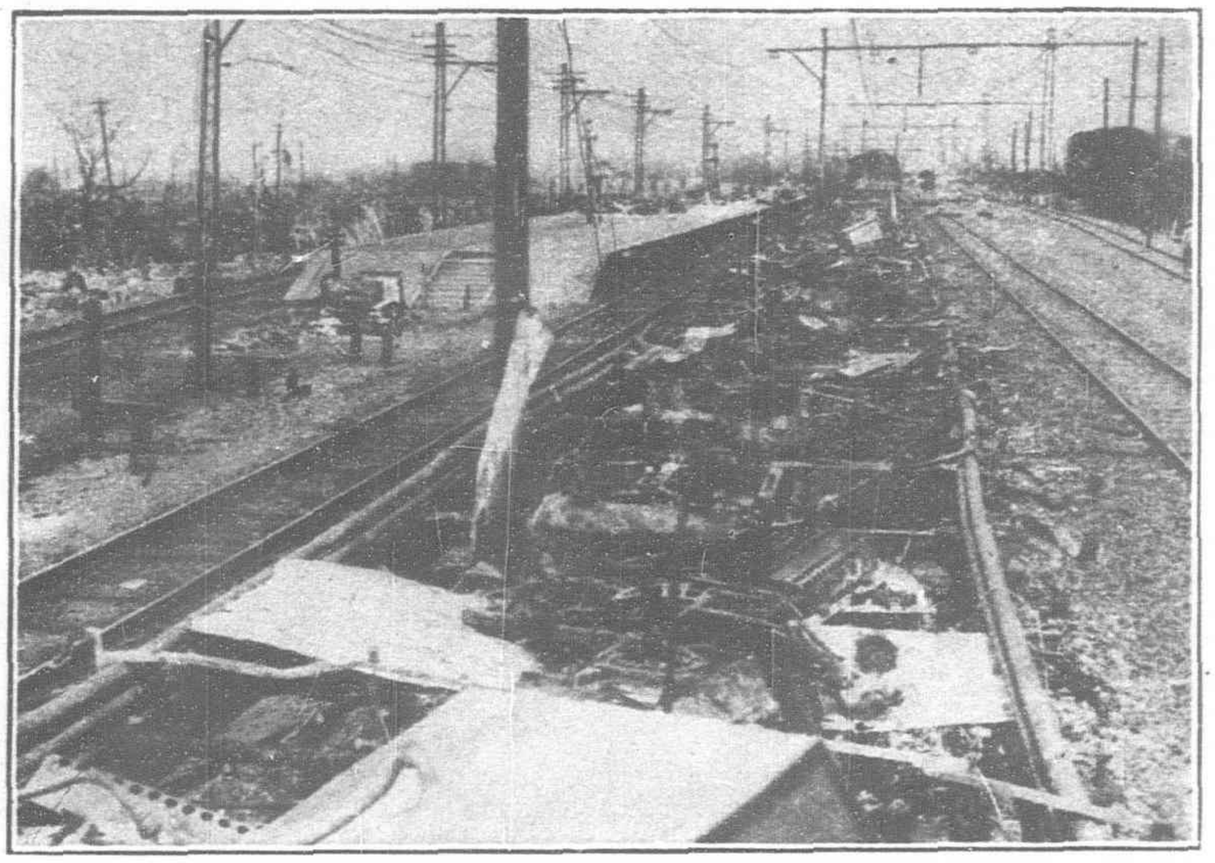
The reinforced concrete warehouse of the Mitsukoshi Department Stre, collapsing in part on the first shake of the quake, and gutted by the fire.



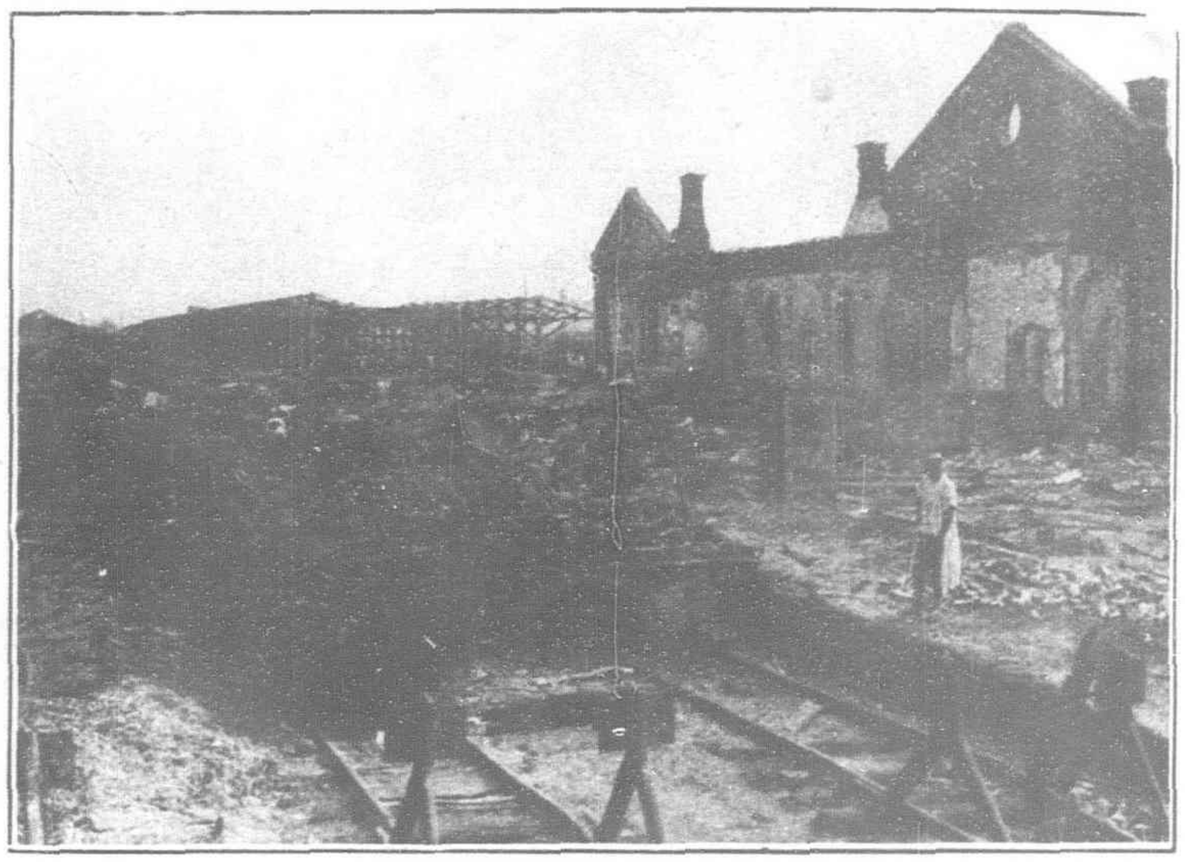
The Ryogoku Station of the Imperial Railway in Honjo



Tram Cars burnt near Asakasa Park

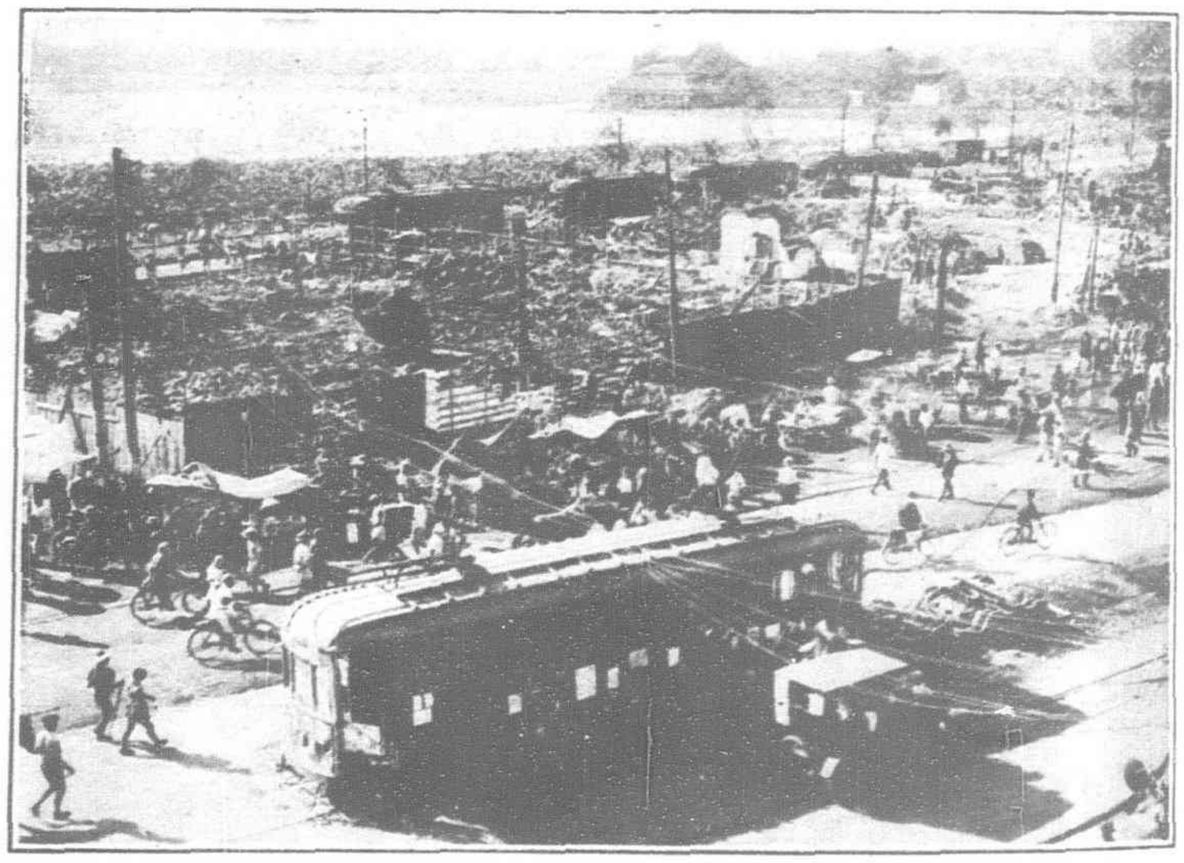


Hamamatsu Station on the Tokyo-Yokohama Electric Line



The Uyeno Station of the Imperial Government Railways

Outside of Car Barn in Yurakucho



Looking towards Shinobazu Pond from Uyeno Park

HOW THE RAILWAYS AND TRAMWAYS FARED DURING THE FIRE

winter. Devastated areas are now under martial law in order to facilitate relief and expedite shelter construction before cold weather begins in January. If supplies from America are shipped promptly much can be done during the next two months to alleviate suffering and forestall winter hardships. Over 600,000 houses entirely destroyed and at least 1,500,000 people will have to be provided with immediate shelter. The Japanese authorities are displaying great courage, energy and determination. The present non-party administration is admirably selected to face the crisis and is doing everything possible. In addition to generous contributions from the imperial family and government the Japanese people have already raised $15,000,000 by voluntary contributions. After careful study of urgent requirements the following list of supplies was submitted as the official request of the Japanese government through the earthquake relief bureau in answer to the generous proffer of assistance by the American Red Cross Society":—

100,000 girl's winter dresses; 100,000 girl's woolen cloaks; 100,000 pairs girl's stockings; 100,000 shawls; 300,000 yards cotton flannel; 150,000 blankets; 3,350,000-lbs. of cotton for making quilts; 1,000 galvanized iron buckets; 100,000 enamelled wash basins; 100,000 enamelled ware cups and bowls; 100,000 enamelled ware kettles; 50,000 men's suits; 50,000 men's winter overcoats; 40,000 pairs of men's shoes; 60,000 pairs of shoes for children; 100,000 neglige shirts; 200,000 soft

collars; 100,000 men's caps; 50,000 cotton overalls; 40,000 sweaters; 30,000 safety razors and blades; roofing materials and nails."

American aid did not end with the Red Cross activities, chambers of commerce and other purely local associations swelled the relief funds with their contributions; the American government through Secretary Hoover offered to furnish the Japanese government with all kinds of supplies at the lowest costs in order to assist the sufferers and facilitate reconstruction. The invitation was gratefully accepted and the initial order has gone forward for 9,000,000 feet of lumber and 120,000 tons of iron and steel, consisting of galvanized iron roofing, sheets and structural material. The Japanese government has decided to order through the American government practically the entire quantity of iron and steel required for the first year of reconstruction, controlling its distribution through the local dealers and supervising prices in order to prevent profiteering.

Secretary Mellen, Secretary Hoover, and Mr. Strong, head of the federal reserve board, assured Mr. Inouye, the new finance minister, of their deep sympathy, solicitude and desire to help Japan financially to any extent, while Ambassador Woods supplemented their offers by declaring that Japan can have a billion dollar loan from America when she wants it. Other prominent bankers have come forward and offered to subscribe to large issues for reconstruction. The same hearty sympathy and proffers of financial assistance came from London. Japan will not lack funds when her reconstruction program is formulated. One of their first steps was to telegraph for Mr. Charles Beard, the American municipal expert (who last year investigated and made a full report on Tokyo for Mayor Baron Goto) to assist with his advice. Although it is too early to make accurate statements as to the manner of their employment, it is the intention of the Japanese government to call in the services of many American and foreign experts to advise them in the reconstruction of the capital and port.

Aside from the larger features of American relief work, no mention of the disaster would be complete without some reference to the splendid initial activities of Ambassador Woods and his staff. The ambassador, but newly arrived in Japan, is a wonder. Tired of the monotony of diplomatic life in Spain he requested a transfer to some more active post. He was sent to Japan. After the first three weeks of official rounds and courtesy calls, he probably felt bored and wondered how he was to get any real action out of life in dreamy old Tokyo. About midday on the first day of September, seated at his desk discussing things in general with Colonel Burnett, the military attaché, the subject of earthquakes came up. The ambassador was remarking that he would like to feel a real eart——. He got no further. The ambassador was thrown out of his chair, wondering what had struck him. The embassy careened, came back and started to fox trot around the compound. "This is a real one," said Burnett, reaching out and pulling him away just in time to save him from being buried under a falling wall. From that minute, the American ambassador has been active. That night the old wooden embassy buildings, relics of a bye-gone age and a monument to congressional parsimony went up in flames. The ambassador's wife and her mother had a miraculous escape. For several days they slept on the floor in a Japanese house in the suburbs, while the ambassador with his sole remaining clothes—those he had on—was organizing searching parties and sending out relief for destitute Americans.

When told, the record of heroic rescues, of heartrending suffering and unbelievable escapes from death, will make a story that will bring tears to the eyes of the readers. It is not our purpose to refer to these in detail. But when the full story is told, the record made by the American embassy staff will stand as one of the bright spots in the great tragedy. Living up to the highest traditions of their country, this small group of men, assisted by other Americans, whose homes, offices and business were ruined; many who had lost their all, even to members of their families, came together by common impulse and under the general leadership of the ambassador and the active command of Colonel Burnett, organized themselves into a relief corps and labored night and day without rest until their countrymen were accounted for. The embassy and relief headquarters was transferred to a wing of the Imperial Hotel the day following the fire. Around the nucleus of the embassy staff came together a group of Americans of all classes, old and young, business men, managers and heads of great concerns, clerks, professional men and others. They all worked, some at driving cars, others hustling baggage, loading trucks, transporting refugees to safety at Yokohama, or aboard the naval vessels or some steamship bound for Kobe or home. No task was too humble for them. Their example was an inspiration to the Japanese who will never forget the sight of these Americans working like laborers in their shirt sleeves on their tasks of mercy.

At the head of the relief organization stood Lt.-Col. Burnett, ably assisted by Major Faymonville who took charge of all refugees. Lt.-Commander Garnett Hulings, assistant naval attaché, came rushing down from Chuzenji on learning of the disaster and assumed charge of the naval end of the relief work, maintaining constant and efficient contact between Burnett and the fleet. The five language officers of the American army studying in Japan fell into line behind their chief and took charge of details; Major Witsell assisted by Lt. Cranford kept the records and information lists; Captain Clear directed the transportation; Captain Martin, the supplies with Major Crane as the *liaison* officer between the embassy and the fleet. Hugh Wilson, councillor of the embassy, J. J. Caldwell, the Japanese secretary and Ferdinand Mayer, 1st secretary of the Peking legation, carried on the routine and official work of the embassy, keeping in touch with Washington and the Japanese authorities. It is difficult to record the individual work of the many Americans who gave their time and labor to make the relief work a success, but the most faithful and hardest worked of them all was David Tait, a newspaperman, who had active charge of transportation. Captain V. C. Wagoner backed him up by keeping the cars in working order. The efficiency of the whole organization depended upon the work of these two volunteers.

Col. "Sam" Reber, representative of the Radio Corporation of America, smoothed out the tangle of getting information through to Washington by radio in addition to being a tower of strength in the initial movement of organizing Americans for relief. The ambassador is the proudest diplomat in the American service. He loses no opportunity in telling the world about the efficiency of his staff and the wonderful work they accomplished in the first few days of the calamity. If he had his way, every officer would have the medal of honor and a promotion in grade. His countrymen and subordinates are equally proud of their chief. The Japanese are loud in their praise for the way he handled the situation. The ambassador came to Japan seeking activity. He found it and made good.

These activities, however, concentrated largely on the immediate relief of American citizens, were only the beginning of the larger measures undertaken by the American government and Red Cross for alleviating suffering amongst the Japanese. On the day of the quake the *President Lincoln* bound south, left Kobe in complete ignorance of the catastrophe. Amongst her passengers, hurrying to join General Wood at Manila, were two of the most capable and distinguished officers of the American army, Brigadier-General Frank S. McCoy, assistant to the governor-general, and Colonel George Langhorne another member of his staff. They learned of the disaster when the *Lincoln* arrived at Shanghai. Without awaiting orders they booked a return passage on the outgoing Pacific Mail Liner *President Pierce* sailing the next day for Japan, cabled the war department and General Wood of their movements and on reaching Kobe received instructions from Washington to proceed at once to Tokyo and take charge of the American army and Red Cross relief work. Washington lost no time in meeting the emergency when the first terrible news of the disaster was flashed from Iwaki. Aboard the *President Pierce*, under urgent cabled orders from the state department, were Consul-General Cunningham, and Vice-Consul Wright from the Shanghai office and Consul-General-at-Large Johnson, commissioned to render all help to the legation and American citizens and reestablish the Yokohama consulate. Cunningham remained at Kobe to assist the overworked staff at that port under Consul Dickover, while Johnson and Wright proceeded in the same steamer to Yokohama. They are there now, living in tents or aboard the station ship, togged out in nondescript khaki costumes with blue flannel shirts without collars, working like common laborers assisting Americans in distress, helping business men to locate their properties, blowing open safes, identifying and burying the dead, handing out provisions and in general making themselves useful in many extraordinary and unofficial ways. It's worth a trip to Yokohama to get a glimpse of Johnson, the quiet, unassuming, genial young diplomat who for the past few years has rounded out physically and officially in the Far Eastern bureau of the state department at Washington.

He is now dropping avordupois by chunks, gloriously happy and contented at the opportunity to do real work. Like the ambassador, Johnson pined for action and is having his ambition gratified. Americans in Yokohama unite in declaring that it is an inspiration to see Johnson at work. They are proud of him. He also has made good.

When General McCoy arrived at Tokyo on the 8th he found that the highly efficient organization under Lt.-Col. Burnett had almost completed the task of relieving American sufferers and the work of assisting the Japanese had assumed paramount importance. At the same time, as assistant to General Wood, he was called upon to ascertain the fate of about 300 Filipino students attending the various medical and dental colleges in Tokyo. Fortunately, at the time of the disaster, this year's graduates and the great majority of the students had gone home to spend their summer vacations and had not returned. However, urgent telegrams were pouring in from Manila from anxious parents asking about their sons. General Wood cabled a special fund for their relief and within a few days most of those residing in Japan, about thirty in all, were located, provided with clothing, food and funds and those who so desired, sent home.

Early on the scene was an American Red Cross unit from Shanghai consisting of three doctors and eleven nurses under the direction of Dr. Miller, professor emeritus of surgery of the University of Pennsylvania, who was visiting China and volunteered for the work. The funds for equipping this unit were hastily raised by Mr. Harold Dollar and the American chamber of commerce of China, the *personnel* selected by Mr. Arthur Basset and Dr. Fearn of the China central committee of the Red Cross Society and placed under charge of Dr. W. W. Peters, secretary of the committee. This unit landed in Kobe on the morning of the 13th and by three in the afternoon had taken over the temporary hospital established on the roof of the Oriental Hotel by the international relief committee of that port. Foreigners and Japanese praise the efficient, unostentatious manner in which the Shanghai unit jumped into the first opening that presented without waiting for instructions from the authorities.

With the arrival of General McCoy and Colonel Langhorne in Tokyo the more important work of handing over the relief supplies contributed by the American army and the Red Cross was carried forward with the utmost dispatch. At the outset, the Japanese authorities very wisely declined to accept the services of foreign *personnel*, feeling that the language barrier, differences in methods of working and in view points would inevitably lead to misunderstandings and possible friction. This, they were determined to forestall at all costs. However, it was pointed out to them that several small hospital units had already embarked from Shanghai, Manila and San Francisco, and if their services were rejected it might lead to the very thing were most anxious to avoid. The Japanese authorities therefore modified their decision to the extent that all foreign relief units who had already started would be permitted to land and function. To facilitate the relief work all supplies were handed over at the ship's sides to a representative of the Japanese government, who assumed all responsibility for their landing, transportation and distribution. This greatly expedited the task of the Americans, relieving them of the expense of erecting storehouses, operating a costly transportation system and employing large gangs of laborers.

At the same time, the Japanese government appointed Mr. T. Sakai as the director-general of the Japanese Red Cross in order to co-operate with General McCoy. In this appointment, the Japanese were most fortunate. Mr. Sakai, a graduate of Harvard, is one of the ablest business executives of Japan. As managing director of the great Mitsui interests he controls a world-wide organization whose efficiency was demonstrated at the time of the quake in the most striking manner. The Tokyo office of Mitsui was talking over the long-distance telephone with the branch at Kobe when the first severe shake interrupted the conversation. The Tokyo manager's last words were: "there is a terrible earthquake." The line was then broken. Repeated unsuccessful efforts to resume conversation convinced the Kobe office that a serious catastrophe had occurred. The same intuition which moved Americans to instant action started the wheels of the great Mitsui organization turning. Wirelessing all the Mitsui ships within the Japanese zone to return to Kobe, that same afternoon supplies were hurried aboard the first available steamer. On Monday morning, the first ship from the outside to report to the Japanese admiral at Yokohama, flew the Mitsui house flag, in from Kobe loaded with rice and provisions, with others trailing along behind her with further supplies for the destitute. The Mitsui head office, bank, mining department, the Mitsukoshi department store, and warehouse, the Shibaura Engineering Works and other edifices owned by the firm, after standing the quake were gutted by fire. Setting aside the pressing need for his services at such a time, the Mitsui family and his immediate chief, Dr. Takuma Dan, gladly gave their most efficient executive to head the relief work for Japan. Surrounding himself with a group of earnest young workers, for the most part educated in America, and having as his right-hand man, Mr. H. Saito, of the foreign office (recently Japanese consul at Seattle), Mr. Sakai pitched into the thick of the work and established headquarters in rooms adjoining the offices of General McCoy in the Imperial Hotel. Through personal contact at all hours of the day and night, Mr. Sakai has created a spirit of co-operation, sympathetic understanding and mutual helpfulness that will stand as one of the cherished memories of the American mission's work in Japan.

This sentiment was strengthened and emphasized when the venerable statesman, Prince Matsukata, the last of the elder statesmen, one of the five men who made modern Japan, placed his palace in Mita at the disposition of General McCoy for use either as a hospital or as the American Red Cross headquarters. This mute acknowledgement of Japanese appreciation and gratitude towards Americans for their prompt and disinterested assistance is only equalled by the similar gracious offer of the prince regent in placing the palace of Prince Takeda, brother of the emperor, at the disposition of the American ambassador until such time as the American embassy is rebuilt. Owing to the urgent necessity of keeping in close and constant touch with the embassy and the Japanese relief bureau, General McCoy was unable to accept the invitation of Prince Matsuktata. Ambassador Woods, however, accepted the other invitation and is now comfortably installed in the imperial palace at Mita, until such time as congress decides to appropriate funds for the rebuilding of a suitable embassy. In the meantime, the American embassy will be confined to a few rooms at the already over-crowded Imperial Hotel.

Each of the army transports brought to Japan complete base hospitals with infirmaries, tentage, medical supplies, beds, cots, blankets, kitchens, and sanitary utensils. The first of these hospitals arriving on the transport *Merritt* was erected on the reclamation ground under the bluff at Yokohama. Another was set up on the site of St. Luke's hospital at Tokyo and the third on the grounds of Prince Takamatsu in Mita ward. At the head of these army medical units is Colonel E. L. Munson, who, next to General Gorgas, is the foremost sanitary expert in the United States. General Wood specially requestefl the secretary of war to send him to Manila in order to reorganize the insular public health bureau and improve the sanitary conditions of the islands, allowed to deteriorate under the direction of Filipino *personnel*. When the news of the Tokyo catastrophe reached Manila, General Wood at once detached Colonel Munson from his duties and ordered him to assume direction of the hospital units and medical relief work, and if called upon, to place his services as sanitary expert at the disposition of the Japanese government. Under him are Major Martin and Captain Craig of the medical corps, superintending the hospitals at St. Luke's and at Mita. When erected and in operation the hospital at Yokohama and Mita are to be turned over to the Japanese Red Cross, while the one at St. Luke's will be presented to the American board which operated the institution destroyed by the fire.

The extent of these hospitals may be judged from the following figures. At Yokohama, the present capacity is 500 patients with ample tentage for expanding and taking care of 750. This includes administration offices, *personnel*, and full equipment with a water supply piped from the Bluff and chlorinated before delivery. Roads have been built and every preparation taken to cope with any outbreak of an epidemic, which, fortunately to date, has not appeared. At St. Luke's on the water front of Tokyo, the hospital has a capacity of 220 beds, or three times the capacity of the destroyed establishment. The Red Cross hospital on the grounds of Prince Takamatsu is equipped with 500 beds and is taking care of nearly 900 in-patients suffering from fractures or burns, the result of the earthquake or the fire. There is a maternity ward in a separate building takng care of 125 to 175 cases. It is interesting to note that before the quake the entire hospital facilities in Tokyo was only 4,000 beds, of which about 60 per cent. was destroyed. The American army contribution will total over 4,100 beds with fully equipped and

organized staffs. The transport *Somme*, hastily placed in commission in San Francisco to load relief supplies for Japan, brought the following immense hospital equipment:—One base hospital, complete with 1,000 beds; 12 field hospitals complete with 216 beds (the transport *Meigs* also brought two field hospitals from Manila making 14 in all, the average cost of each unit being $40,000) 52 camp infirmaries or small hospitals; 52 camp infirmaries medical reserve supplies; 30,000 pajamas; 30,000 sheets; 20,000 blankets; 5,000 bed sacks; five medical and surgical chests; 40 supplementary chests; 3,000 mattresses; 63 hospital tents, 16 beds capacity each; 120 tents tropical hospital type with a capacity of 6 beds each; 797 large storage tents suitable for housing large families; 3,300 pyramid tents suitable for one family each; 3,000 metal and 5,000 wooden folding beds in addition to over 2,000 tons of miscellaneous medical supplies, some of them of great value. It is too early to make an exact statement of the value of the army supplies sent to Japan, but a fair estimate will approximate $3,000,000, or about the same amount that was expended by the navy. If the American navy was first on the scene, the American army was not far behind, both branches of the service operating on the spur of a humane impulse to show their friendliness towards a gallant people who only a few years ago were held up to them as the imaginary enemy.

Major-General George Read, commanding the American army in the Philippines, with his chief of staff and other officers, came from Manila on the transport *Merritt* in order to personally convey to the Japanese authorities and especially the Japanese army the assurances of American good-will and sincere desire to help, returning at once to Manila on the same vessel when their mission of courtesy was ended. On the same transport came Captain H. W. Rogers and Mr. Thomas Wolf, official representative and treasurer respectively of the American Red Cross in the Philippines and on the next steamer Mr. Knowlton Mixer, chief of the Red Cross in the Far East arrived, bringing to General McCoy two of the most experienced relief administrators in the Red Cross service. Dr. C. N. Leach, representative in the Philippines of the Rockefeller Foundation, was also sent to lend his valuable services to the mission and at the same time to convey to the scientific staffs of the Tokyo universities the offer of the Foundation to send ten specially selected men with their entire families to Peking to continue their studies at the Rockefeller Institute, the Foundation paying all expenses. This generous offer was gladly accepted and a happy little group of Japanese scientists with their families are now preparing to spend a year in Peking as the guests of the Americans.

It may not be out of place to bring in at this juncture a word about the work of the Japanese army. Brfore the disaster there was considerable talk of reducing the Japanese army, but its splendid record during the days of chaos, has completely altered public opinion as to its efficiency. It is frankly admitted that the army saved the situation. It was on the job immediately. The men worked long hours without grumbling, responding to the emergency magnificently, meeting every situation promptly and efficiently. At the time of the quake the Yokohama court was in session crowded with people. The court house collapsed at the first big shake burying hundreds of people in the ruins. The Yokohama police force was practically wiped out and for the first two or three days organized looting was carried on by bands of desperadoes, who were checked and dispersed only by the arrival of the military. The quake also freed the convicts in the Negeshi prison on the outskirts of Yokohama, who, in the absence of the police, indulged in a carnival of crime until the army appeared on the scene and put them down. In view of the stories circulated by foreign refugees about the killing of Koreans and shooting down people in the streets, the above facts will help to explain something of the situation in Yokohama. The Japanese army justified its existence.

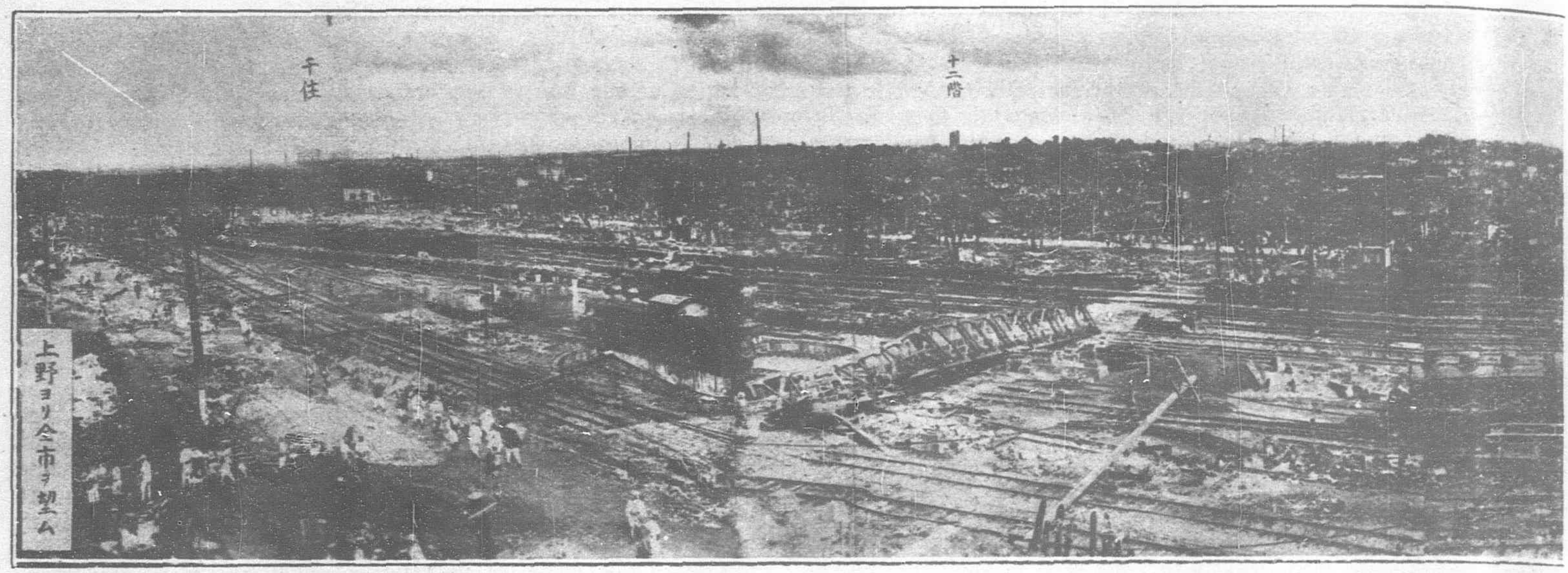
The army simply typifies the splendid spirit of the people who met the unprecedented disaster with their traditional fortitude. History does not record a battle in which so many lives were lost, so many deprived of food, clothing, shelter and the necessities of life as in the twenty-four hours of hell which broke over the fairest part of Japan on the first of September. In war, organized, armed and trained men take their chances with a full knowledge of the game and the penalties of defeat. Here the calamity fell upon a defenseless people, women and children, old and young, without a minute's warning. It came as a bolt from the blue, killing outright over 250,000 and wounding probably more than twice that number. The swift spreading conflagration herded the people in the small open places where they were smothered and cremated by thousands, and drove over two million out of the cities to seek shelter in the country, itself torn and wrecked by continuous earthquakes. The solid earth seemed to turn into a quivering mass of jelly. Before midnight of the first of September, following the first angry upheaval, two hundred and twenty-one shakes were registered on the Tokyo seismograph; 323 came on the 2nd, 181 on the 3rd, 184 on the 4th, and 109 on the 5th, dwindling down from that record to ten a day on the 16th. Up to that date 1,319 shocks were registered, and even as this is written on the 30th, the earth is still trying to find its equilibrium. Many of these subsequent shocks were good sized quakes in themselves violent enough to send the people scurrying in fear and trembling out of their improvised shelters and houses into the streets and open places. The experience was terrible enough to break down the *morale* and paralyze any community of less courageous fiber. The Japanese, however, rose to the occasion. They did not mope or fill the air with lamentations or lay down passively and wait for outside relief to save them. The general orderliness of the people, the universal decency and spirit of mutual helpfulness which characterized their reaction and the prompt mobilization and unobtrusive efficiency of the military and police stands unparalleled in the annals of great disasters.

Out of the chaos of destruction, amongst the twisted ruins and ashes of buildings, began to appear as by magic the humble temporary shelters erected on the still warm and in some places smoking ashes of the Tokyo that was. People came back to the little square of earth they called home and under shelters of galvanized iron sheets salvaged from the *débris* and hammered into shape, faced anew the bitter struggle for existence.

Tokyo and Yokohama will be rebuilt. You can't blot out cities peopled with such spirit. It will take years and the expenditure of billions of yen to reconstruct the capital and chief port of Japan. Many weary, heartbreaking months will pass before anything like a new city will take the place of the one destroyed, but the indomitable courage, legacy of the Samurai, will win out in the struggle against overwhelming odds and Tokyo, the capital of the fair land of Japan, within the decade will resume its place amongst the great cities of the world, bigger, better and more beautiful.

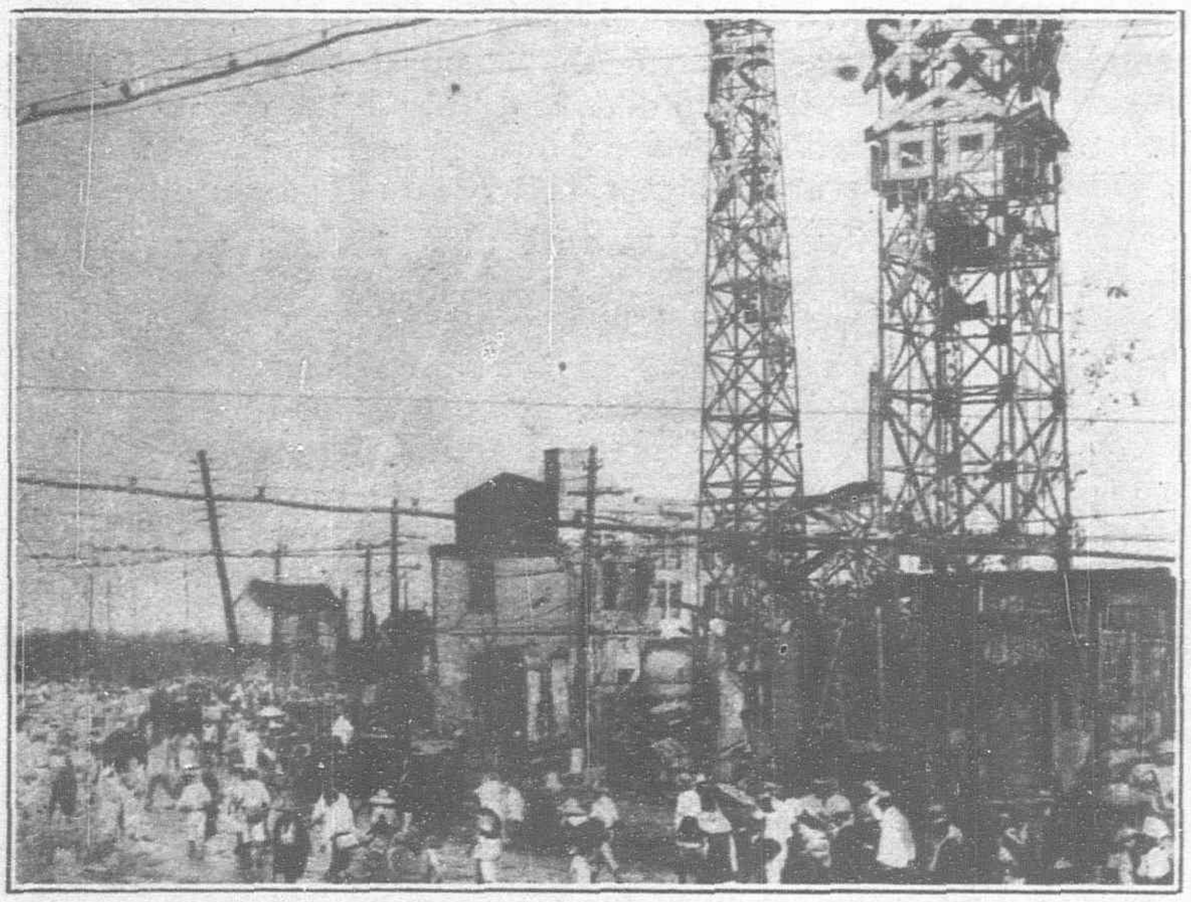
The reconstruction of Tokyo with new streets, sewers, water and park systems, public utilities and buildings will call for the expenditure of at least three billion yen spread over a period of years. Japan can finance some of her own reconstruction from within, but the bulk of the needed capital must be obtained from abroad, from America and Great Britain. Whatever may be Japan's financial requirements, if it is only a billion or a half billion dollars, it is safe to assume that the larger proportion will come from the United States. Once Japanese government bonds are held in large quantities in America, and the American investor is brought into intimate and sympathetic contact with Japan, the way will be opened for the realization of the great dream that has inspired and animated the leaders of Japan for the past several years, the dream that has influenced their government on so many occasions to concede and surrender, special advantages and privileges in order to prove their friendship for America. These men have followed and adhered religiously to a program and policy that would hasten the day when American capital would co-operate with Japanese capital in the creation of industries and commercial enterprises and unite the two peoples in ties of business that would make impossible and inconceivable any future talk of hostilities in the Pacific arising out of Japan's peaceful expansion.

That day has been brought measurably nearer. America has demonstrated in no uncertain manner her cordial friendship and sympathy for Japan, discovering the real sentimental regard that during all talk of war by irresponsible and paid agitators and deluded enthusiasts has remained unshaken in its trust and belief in Japan's integrity and peaceful intentions. The real Japan has also come to the surface. As the facts surrounding the full measure of America's generous and spontaneous relief activities have trickled down to the masses, all former animosity and suspicion of our motives has disappeared. The people of Japan have learned through a terrible cost to themselves what years of propaganda could never have put over; they have learned that Americans are truly their friends. From the regent down through the elder statesmen, the cabinet, the diet, the rank and file of the army, navy and other government departments, through the universities and schools, business men, bankers, and small traders to the man in the street, the revelation has come that a new era is dawning in



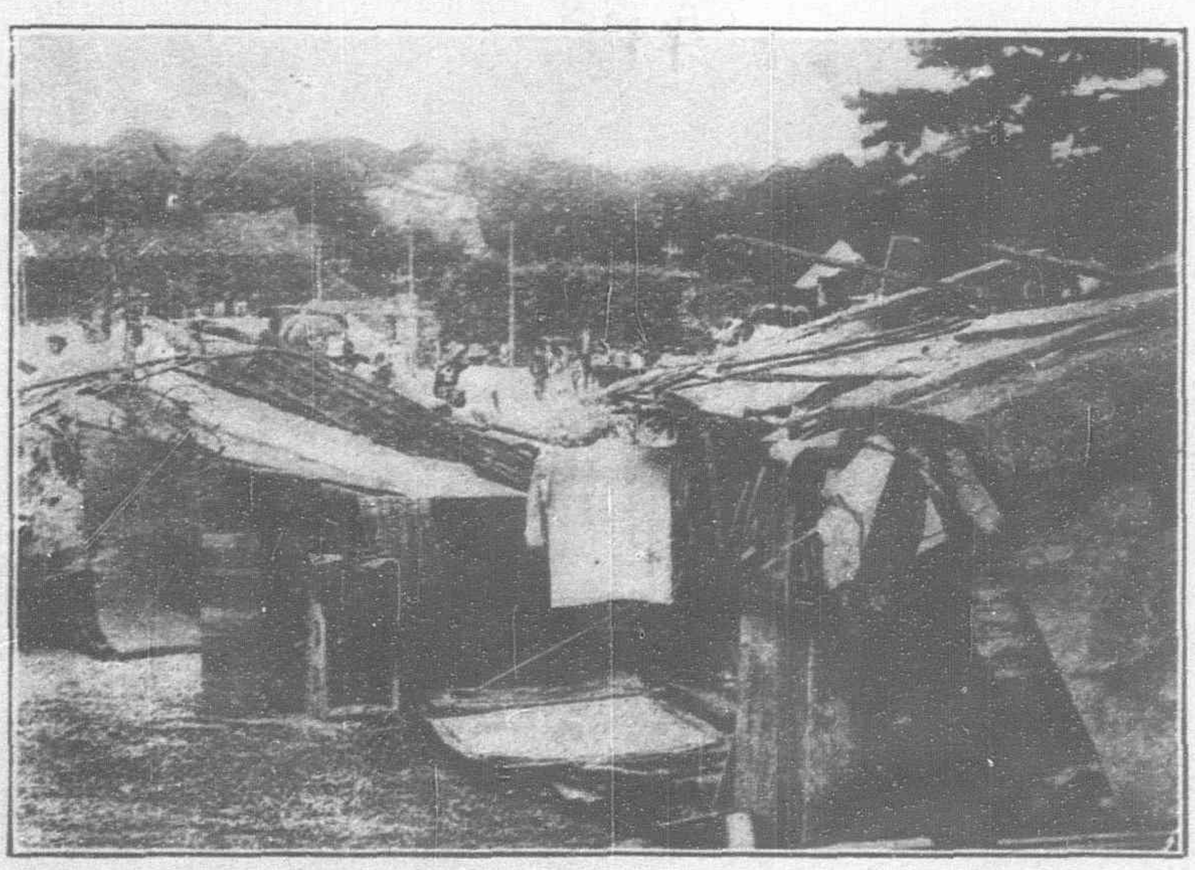
TOKYO LOOKING FROM

the Pacific. The same feeling pervades all intelligent Americans who have had the good fortune to work in close understanding with the Japanese during the period of relief work and penetrate behind the screen of language and traditional reserve into the inner sanctum of their hearts. These men also look far ahead into the future and see the coming together of Japan and America in bonds of sympathetic understanding that will do more toward advancing the cause of civilization and peace than all the treaties, conventions and protocols of the past few years. If this spirit is accepted by Americans of all classes (and it is bound to prevail once the financial ties are drawn tighter) the price that Japan has paid will be repaid many times over. Out of the calamity will come a great blessing. The monetary losses of Japan will be more than saved in the next ten to fifteen years in armaments.

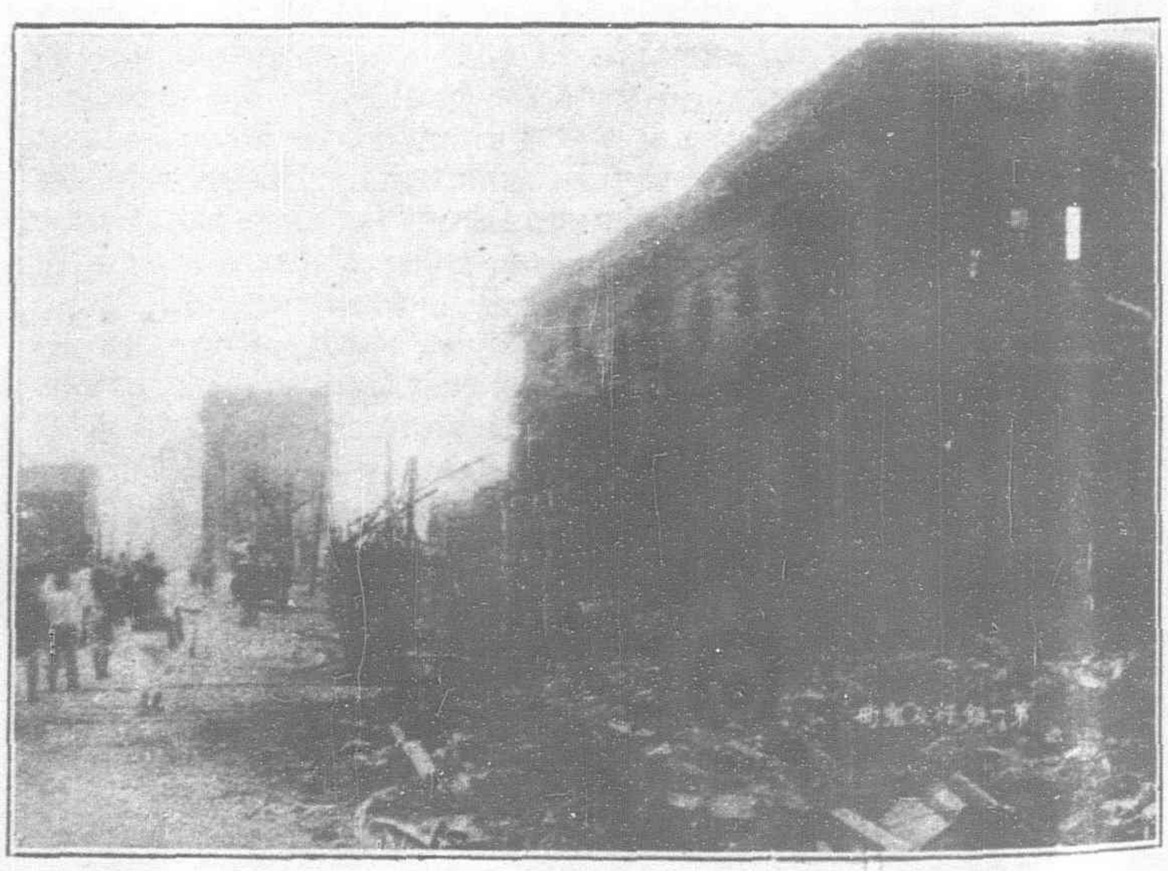


Refugees leaving Tokyo

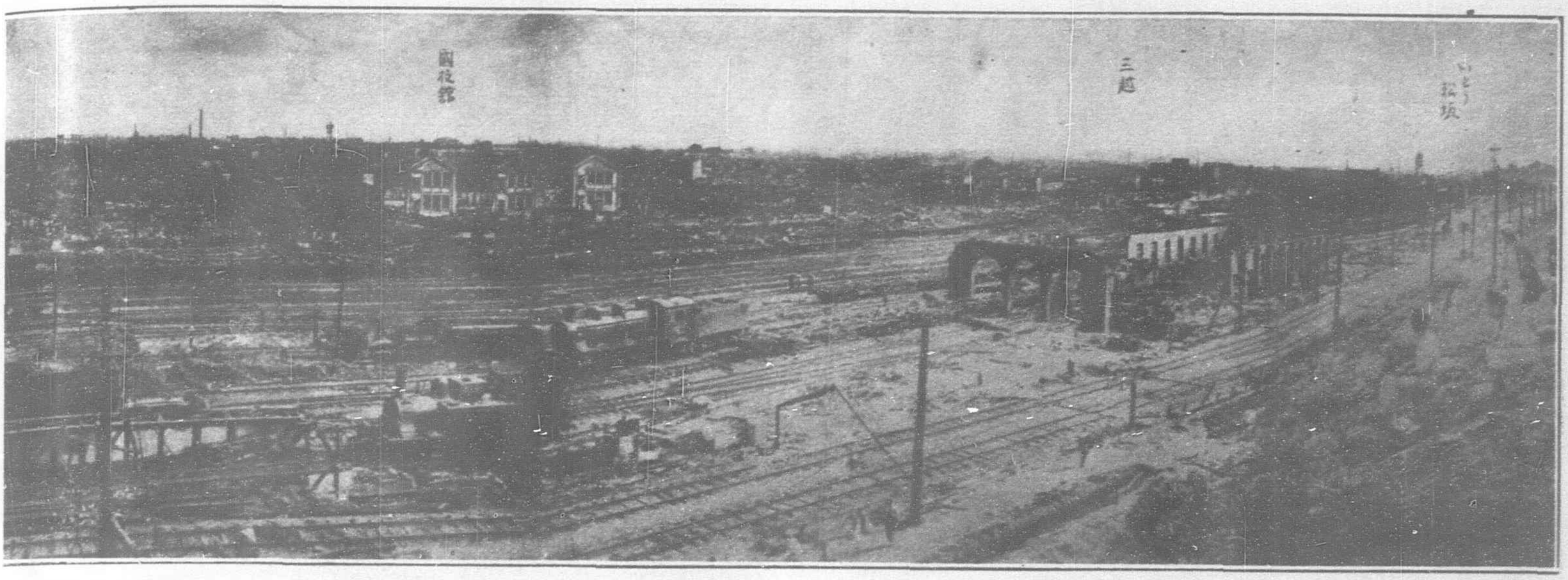
Telephone poles and street lamps remain standing



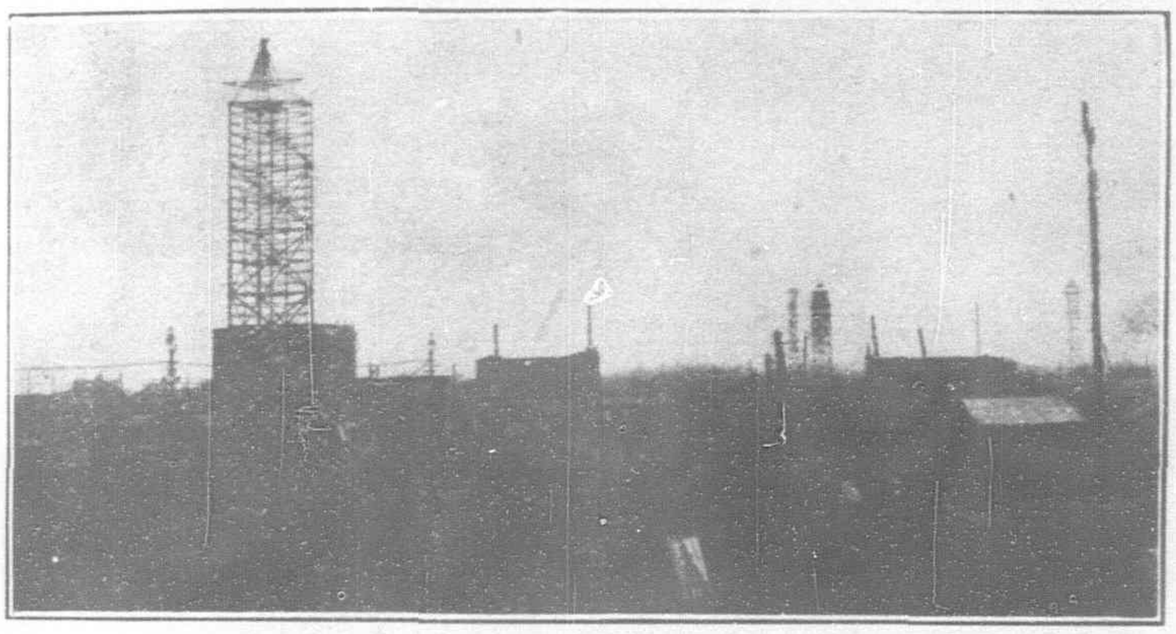
Refugee huts in the Imperial Palace grounds, Tokyo



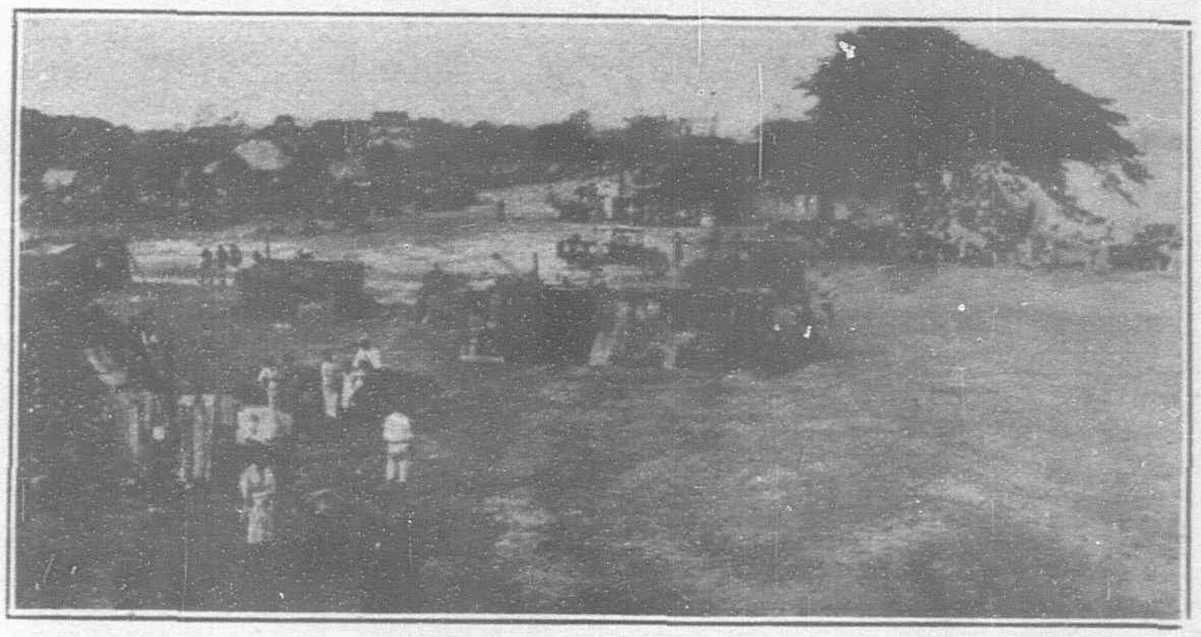
Dai Ichi Ginko, Tokyo



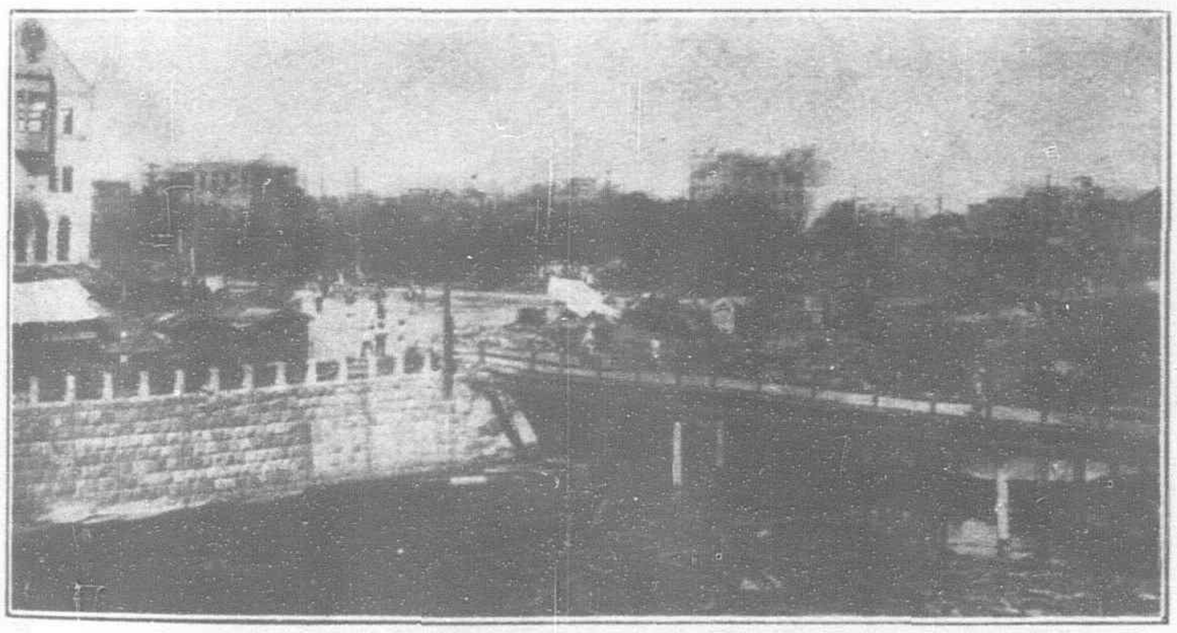
UYENO PARK



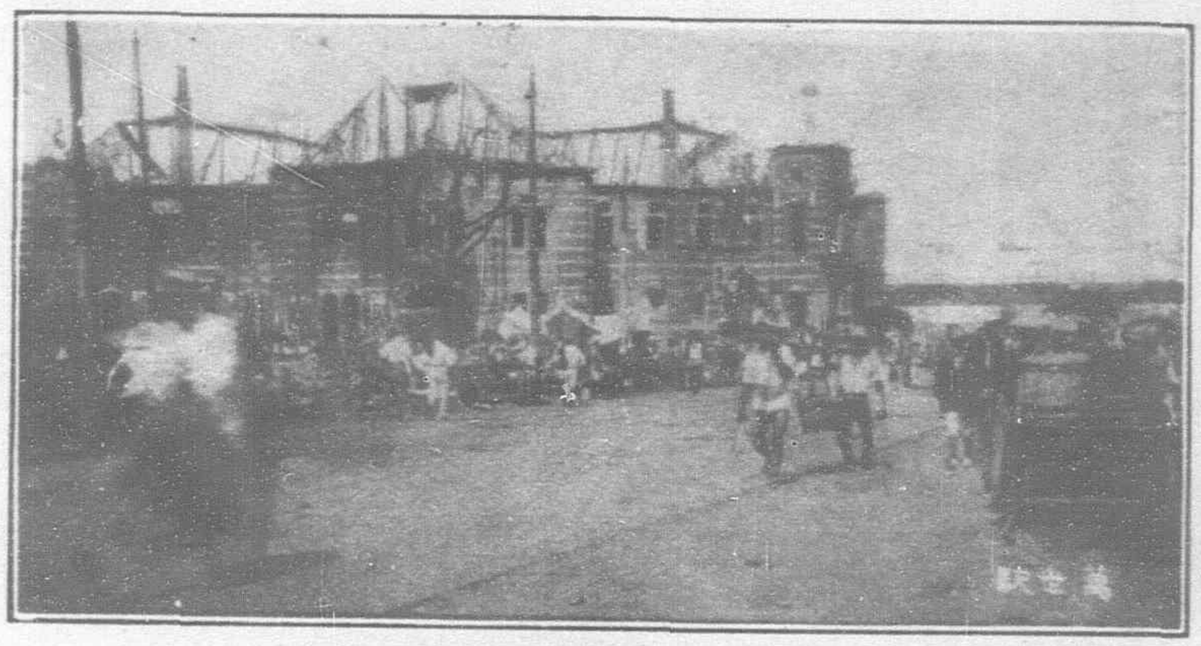
Uyeno Distillery



In front of the Palace grounds



Hitotoubasbi in Kanda, showing Imperial Commercial University Club on left



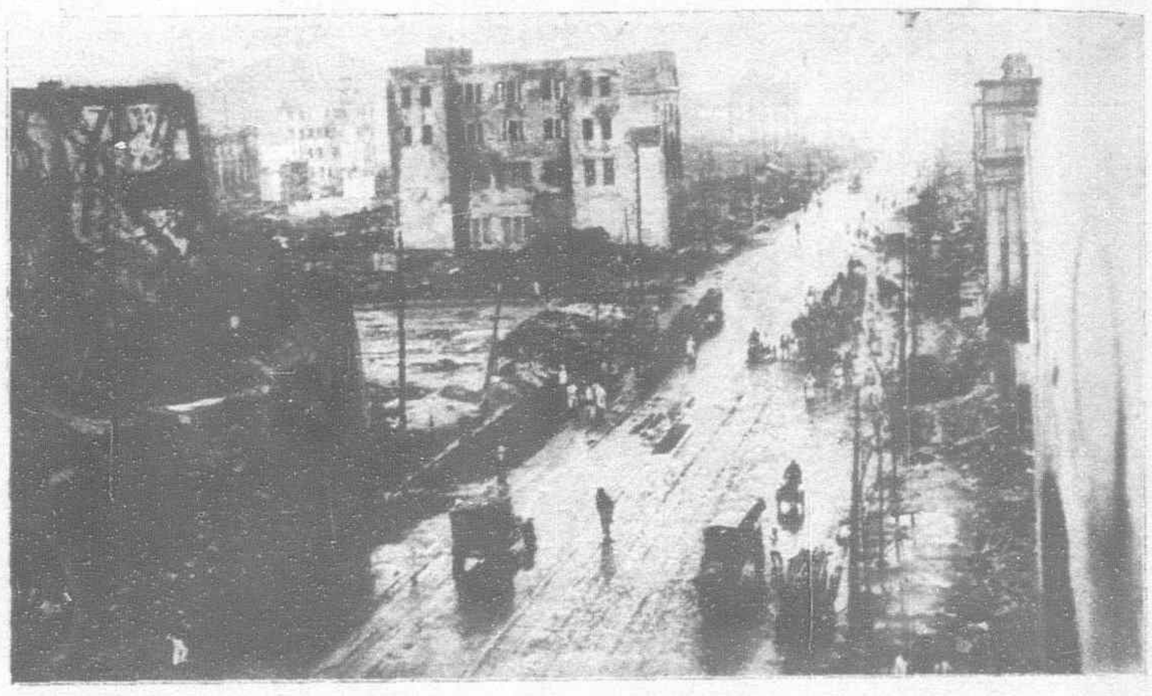
Mauseibashi Station

Yokohama Specie Bank in Tokyo

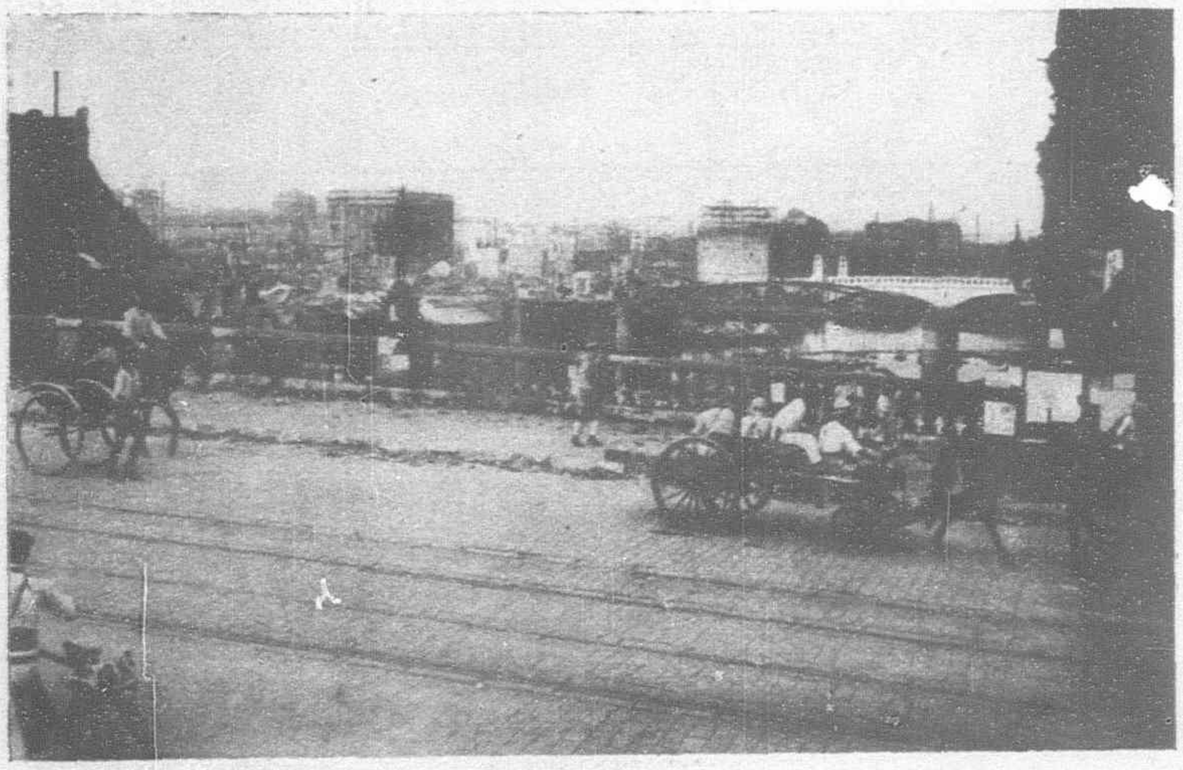
Mitsukoshi, Tokyo

Two views of a modern steel structure that was under construction

Metropolitan Police headquarters, Tokyo the first building to bnrn

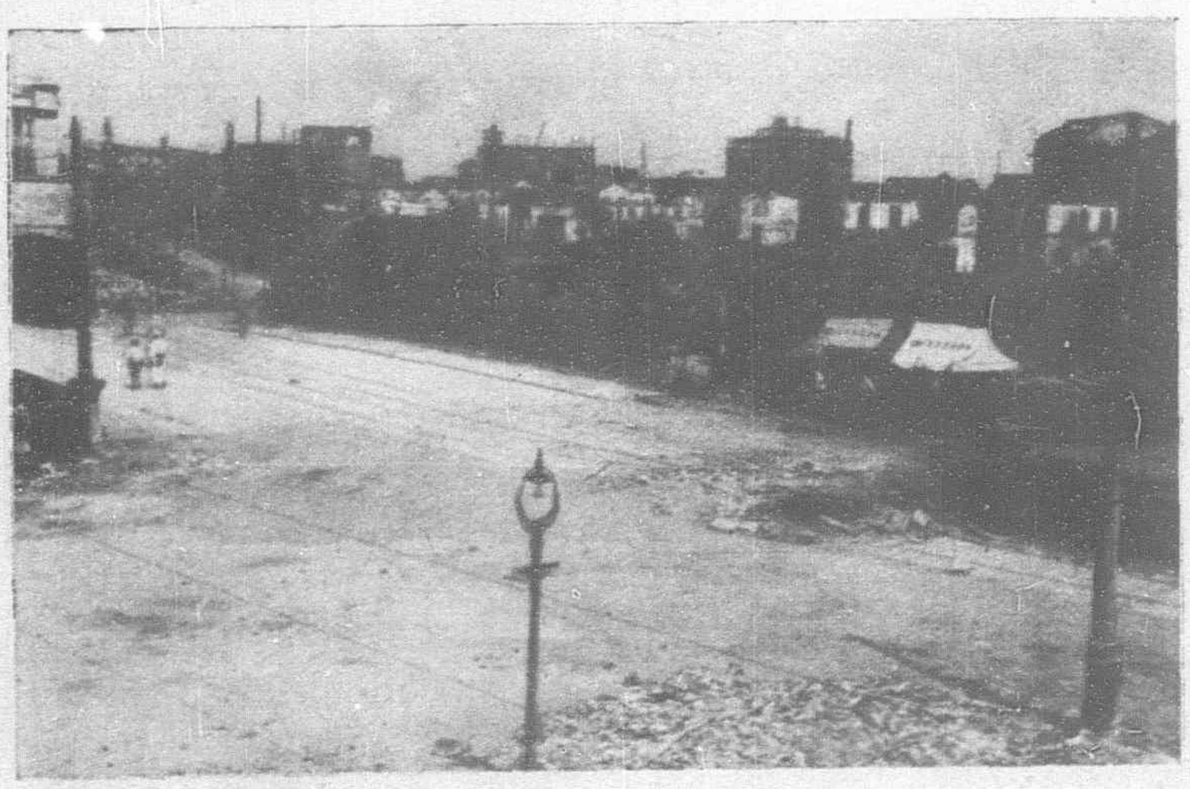


Looking down the Ginza



Nihonbashi Bridge

Looking toward the Ginza



Part of the buildings of the Imperial University

Part of the countless homes shattered by the earthquake.

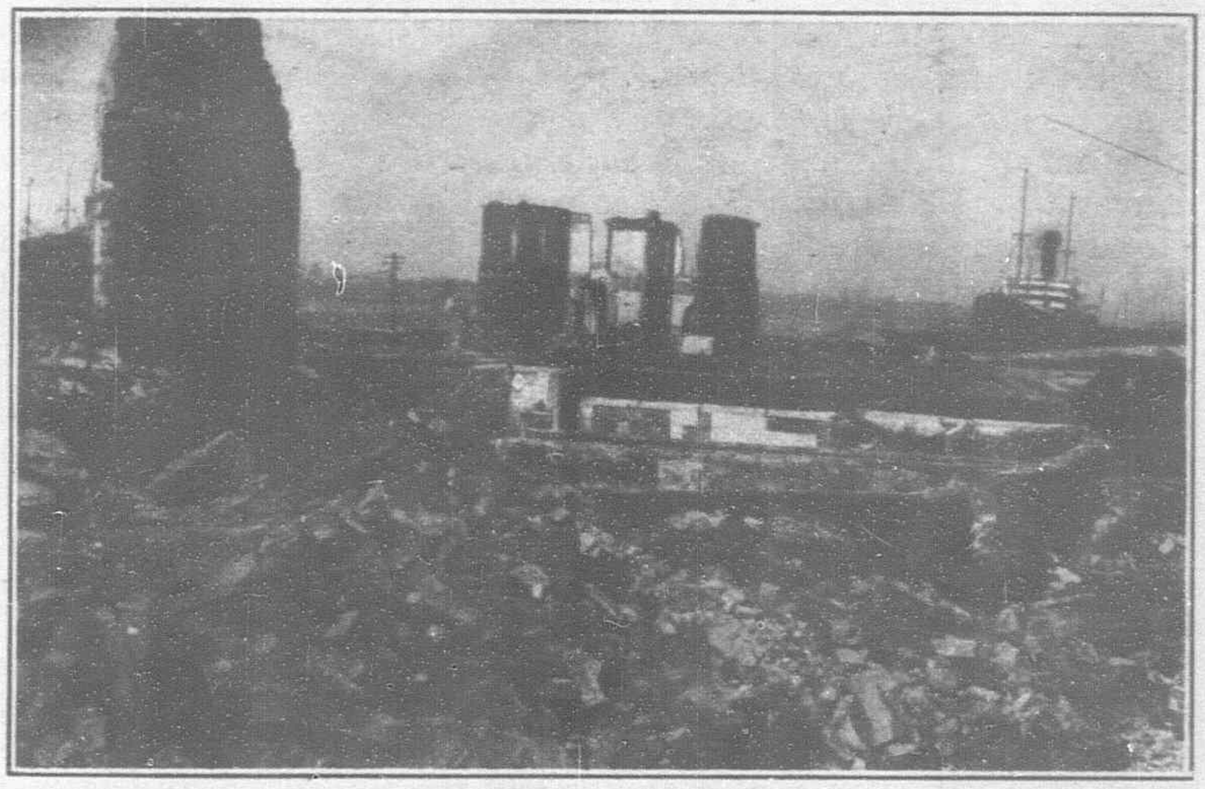
Himagawa Electric Tram Station

Looking towards Kyobashi from Tsukiyabashi

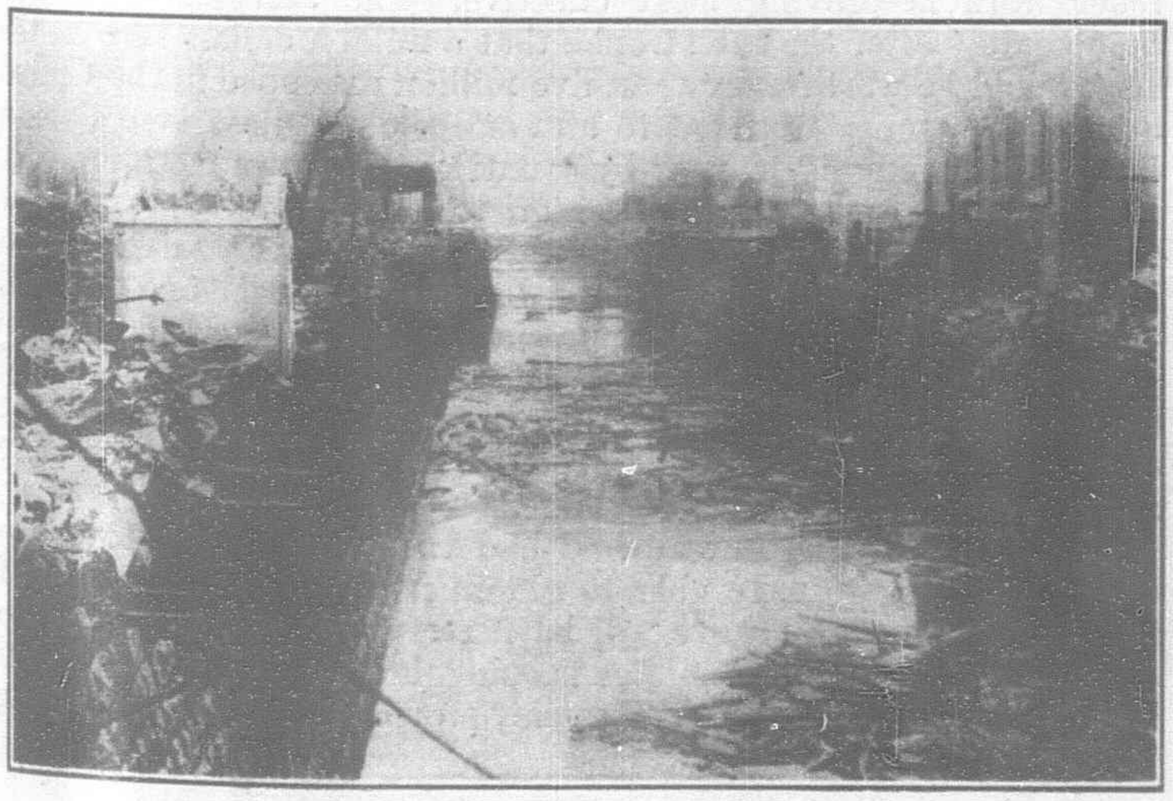
Himbashi Station

Russian Cathedral in Kanda

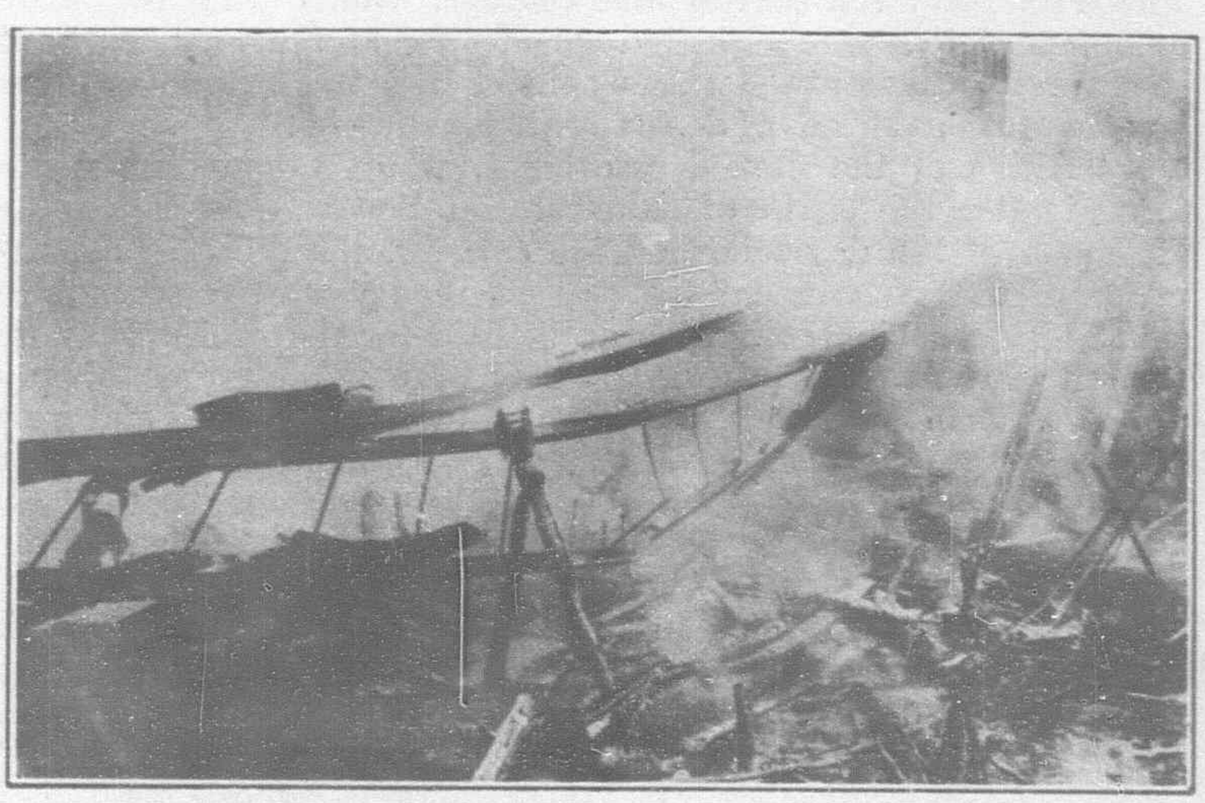
Japanese Fire Proof Godown



Yokohama Harbor



Wreckage fills the Canals



Smoke such as this caused the suffocation of many

American Praise for Japan

Interview with General Frank S. McCoy, Director-General of the American Red Cross in Japan

AMERICANS have been most fortunate in having at the head of their Red Cross and army relief work in Japan, an executive of high ability and broad-mindedness in the person of General Frank S. McCoy, who, during the great war, was assistant chief of staff to General Pershing. For many years General McCoy has been closely associated with General Wood, first as his *aide* in governing Cuba and subsequently in many capacities up to the time when he came to the East in 1921 as chief of staff to the Wood-Forbes mission. When Wood was made governor-general of the Philippines, McCoy was appointed his assistant, and for a time it was reported that he would succeed Wood when the latter retired. Like his chief, General McCoy has always been a great sympathizer with Japan's many complex problems, and immediately realized that the great calamity offered an exceptional opportunity to convey to the people of Japan something of that real American friendship which has been so distorted the past few years by one-sided propaganda. It was also fortunate that the same ideas were shared by every American on the relief mission, and when the same spirit was reciprocated by the Japanese leaders, it created understanding and mutual respect that will have as far-reaching effects as the Washington conference. We know of no situation which required such tact and diplomacy as the one which sent the American fleet and the army transports hurrying to Japan with relief supplies and placing their distribution under the supervision of a general officer of the American army. One false move and the whole effect of the generous response of America to the urgent needs of a proud people would have been lost. That such complete understanding and friendly regard has resulted from the contact of the American mission with the Japanese authorities is due in large part to the scrupulous concern for the Japanese viewpoint adhered to at all times by Ambassador Woods and General McCoy.

In view of the many petty criticisms against Japanese methods and the many absurd stories spread broadcast by foreigners who caught only a fleeting glimpse of the working of the Japanese government in the days immediately following the quake, and to convey to the American people some idea of how the Japanese met the situation and are preparing to handle the relief supplies, General McCoy recently gave out the following official interview. Special stress is laid on the proposal of the Japanese authorities to sell certain supplies at cost or below cost to those who can afford to pay for them while distributing freely everything to the actually destitute. This official statement from the highest American relief officer on the spot is deemed necessary to forstall stories that even now are hinted at, to the effect that the Japanese are selling the supplies so freely contributed by foreigners for succoring the unfortunate victims of the disaster, General McCoy says :

"Both because the American people ought to know the facts and because the Japanese ought to receive proper credit, it is a great satisfaction to me to be able to say that their government has functioned with remarkable ability and their people have behaved with exemplary self-control and courage, even during the acute moments of this unprecedented catastrophe at the very centre of government and at a time when a cabinet crisis was on and there was no constitutional heads of departments functioning.

"Although the Japanese cabinet, which Count Yamamoto formed after the death of Admiral Kato, was sworn in on the afternoon of the day following the disaster, the different departments of the government met the emergency with commendable skill and determination. The army paid for its existence by its prompt and efficient energies, which were notably free of any unduly officious character, while the navy brought relief and gave assistance by sea. The government at once realized the necessity of organizing new bureaus and promptly created them, particularly what might be called a commission for reconstruction and the relief bureau.

"It is this latter bureau and the Japanese Red Cross with which the American contingents are operating, the navy and army supplies being delivered through the Japanese navy to the relief bureau, and the American Red Cross agency working directly with the Japanese Red Cross. The relief bureau has at its head the prime minister himself, the minister of war, and the home minister, men of ability and outstanding character ; and it and the Japanese Red Cross have appointed Mr. Tokutaro Sakai, a graduate of Harvard University, one of the ablest and most responsible business men in the country, to operate directly with us."

"The relief bureau is being conducted as we Americans would expect, not only under the direction of experienced statesmen in a cabinet of non-party character but by captains of industry and practical leaders accustomed to handling large business affairs, who are at the same time men of high integrity and philanthropic disposition. In other words, the Japanese have met this crisis in the same manner in which we met the crisis of the great war by calling out their best talent to face the emergency, regardless of party affiliations. The result is that the machinery for relief and reconstruction throughout the earthquake area is beginning to operate quickly, smoothly, efficiently, and, above all, honestly. The Japanese authorities and people are determined to have no graft or inefficiency in the relief work, and profiteering has been effectively prohibited. The Japanese are throwing practical safeguards around the work and they are as anxious and determined as we would be to prevent or eliminate any discreditable behavior such as might naturally occur in any country in so unusual a situation.

"It is important that our people at home should understand a special feature of the relief bureau's work. The bureau has shown, in my opinion, wise foresight in announcing the intention of giving free relief to the actually destitute while at the same time providing for those whose pride and means enable them to obtain supplies of clothing without impairing their self-respect and without pauperizing many who at this time of strain and stress might be compelled or disposed to accept free distribution. The bureau has evidently realized the danger of being misunderstood in establishing what amounts to a revolving fund, and their representatives have been solicitous that their policy should not be mistaken by the American people, whose generosity has won full appreciation and even astonishment, and whose good-will Japanese of all classes desire to retain. I have assured the Japanese that their plan shows careful consideration which would appeal very strongly to the common sense of the American people ; and I go into this matter at length because some uninformed Americans, on learning that the relief bureau was selling supplies contributed by the American Red Cross, might misunderstand what is being done. It is planned that the funds derived from sales at cost and less than cost to those who are able to pay shall be expended again for other suitable supplies, thus turning over and over again even the gifts of the American people.

"With regard to our particular share in the relief work, it ought to be very gratifying to the American people to know that the policy which Ambassador Woods and Mr. Payne, head of the American Red Cross, decided at the beginning should govern the relief work is proving most effective. The ambassador stated immediately after the catastrophe that a million dollars here on the spot would be worth more than five million expended in the United States ; the money was sent to him and the Japanese were given a free hand in buying in near-by countries the things most urgently needed. The ambassador's decision to leave to the Japanese the actual distribution, which they could more effectively perform than Americans knowing nothing of the Japanese language and customs, was a wise decision heartily appreciated by Japanese officials. In consequence we are delivering our supplies directly to the Red Cross and the relief bureau and transferring our hospital units to the Japanese one after another as soon as they are able to organize staffs to take them over.

"After the relief bureau had had time to study the question of future needs we were able to obtain from them a statement of supplies which they believe will be necessary to carry through the coming winter the two million people who will be living only in improvised shelters. This statement, providing largely for clothing

and blankets, has been cabled to the American Red Cross and has been approved, so that both governments and both Red Cross Societies are working together without waste of effort and looking far ahead. Practically all American Red Cross purchases in the future will be made in the United States.

"We have figured that the full relief which will have been received from the United States will succor unfortunately only five per cent. of the afflicted people. Splendid as the American demonstration has been and profound as has been the Japanese appreciation of our quick and spontaneous generosity it will be seen that we are planning only to undertake a comparatively small portion of the relief that is essential, to say nothing of the gigantic cost of reconstructing the devastated area. This last is an undertaking which only the Japanese themselves can perform, but which they are entering upon with determination and characteristic philosophy."

Radio's Part in Japan's Reconstruction

WHEN the cables broke and the telegraph and telephone lines in eastern Japan went out on September first and newspapermen were rushing through to Kobe in order to get their dispatches through via Nagasaki and China, one modern long-distance radio plant on the Japanese coast near Iwaki, a hundred and fifty miles from Tokyo, kept Japan in touch with the world. Only one railway telegraph line, connecting Uyeno station with Osaka, survived the great quake, the operator sending bulletins through until 5.30 p.m. when the conflagration caught the station passed over and obliterated it. The Osaka papers issued extras based on the bulletins which came from Uyeno and the Associated Press correspondent there had sense enough to shoot his stuff home via Shanghai. As soon, however, as it was learned that the Iwaki radio station was intact, the news from Tokyo was broadcasted by that station continuously throughout the disaster. However, it has since been learned that the Iwaki station had radioed San Francisco on its volition, on the afternoon of September 1, the first news of the disaster and subsequently carried the first official dispatches of our ambassador to the department. A courier service between Tokyo and Iwaki was quickly established for the dispatch at first of official and emergency relief radiograms, but this also served as the real outlet of news to the world, the radio reaching America before the cable. Through this station America first and through America, the rest of the world was apprised of the news of the great disaster. By the 8th wire connection between Tokyo and Iwaki was restored and opened to public service on the 11th.

During the stress of the disaster, there was a prevailing opinion among radio operators on board vessels in Yokohama harbor and Japanese waters that the Japanese were deliberately attempting to jam the ship's radios. In justice to the Japanese, this is very far from the truth. The Funabashi station was the only outlet the Japanese navy had for signalling all its ships and, needless to state, every vessel in Japan was quickly carrying out its full share in the relief work, throwing an immense load on the naval station. Now the Funabashi station operates with an arc transmitter and anyone familiar with arc mush will understand why the vessels in Yokohama harbor could not receive distant signals. When the attention of the Japanese admiral was invited to this situation he at once set aside two hours daily for ship communication.

The splendid service rendered by the radio plants during this period of great anxiety once more brings up the plan whose development was interrupted by the death of Admiral Viscount Kato. On July 27, Premier Kato announced a radical change in the traditional policy of the Japanese government with respect to electric communications, when he stated that it was the intention of the government to permit private operation of high-powered radio stations under suitable government control and that a bill would be introduced in the next diet modifying existing radio laws and granting a government guarantee to the stock of the proposed new corporation. He invited some thirty-eight leading business men and financiers to form a corporation. The invitation was accepted and these gentlemen appointed Baron Shibusawa as chairman of the organizing committee empowering him to select its members. This he did. A meeting of this committee was set for September 6, but the quake intervened.

In view of the pressing demands that will be made on the treasury for reconstruction, a subsidy for such a purpose is now perhaps out of the question. However, the business interests of Japan should not despair, as it is perfectly feasible to organize a suitable Japanese organization, which if able to obtain the proper concession from the government, will be easy to finance and put into operation. This corporation could take over the existing high-powered stations for trans-Pacific communications and erect another high-powered station for communication with Asia and Europe. If such a plan could be made acceptable to the authorities, Japanese business can free itself from the present most inadequate official supervision over their electric communications. For the next few years, rapid, accurate and cheap foreign communication with the markets of the world is one of the foremost essentials in economic rehabilitation. The cost of reconstruction will be greatly reduced by keeping in immediate touch with prevailing market prices. Radio helped to save the situation arising from the quake; it will help to save millions during reconstruction, if properly developed and managed.

The Radio Corporation of America in China

It is of special importance at this time for the government and business men of Japan to take some positive step that will enable their radio communication system to keep up with the rapid developments in other parts of the world and Asia. Although it has recently been reported that Foreign Minister Koo of China had declared his ignorance of the existence of any contract between his government and the Federal Telegraph Company, the following statement given out by General Harbord, president of the Radio Corporation of America, on his return from attending a meeting of the consortium of international radio companies held in Europe, will clarify the atmosphere from the American viewpoint.

General Harbord interpreting the recent radio developments between his company and the Chinese government said: "perhaps we had better begin at the start of these negotiations back in 1921, when the Chinese government granted the Federal Telegraph Company an independent contract to erect five radio stations in various provinces of China for communication with America. Since that time, the Federal Telegraph Company of Delaware has been formed which incorporates the Chinese radio interests of the Federal Telegraph Company and the Radio Corporation of America, and in which the two American companies will participate jointly under the assignment of the 1921 contract recently approved by China.

"This undertaking calls for the erection of five powerful stations in China, the principal one to be located in Shanghai. This station will engage in direct communication with the RCA stations at Hawaii and even San Francisco, over five thousand miles distant. Shanghai will also operate a station of lesser power for communication with similar smaller stations to be located at Peking, Canton and Harbin, each of which cities are separated by approximately 800 miles. In this way the central station at Shanghai will have "feeder" stations in the principal provinces, through which traffic from these several territories will be routed to the giant station at Shanghai for transmission to the western hemisphere. Conversely, Shanghai will be the gateway through which communication from points east will pass into the Chinese interior. These stations will be operated jointly by the Federal Telegraph Company of Delaware and the Chinese government, thus placing the project under Chinese-American administration.

"The confidence of the Chinese government, in entering into active participation in this program was enhanced largely as a result of the limitation of armament conference held in Washington in the fall of 1921. There are no exclusive or monopolistic features in this contract and from the very inception of negotiations, the project had the whole-hearted support of the state department who views the recent completion of plans as a signal accomplishment in international diplomacy.

"American business-men will be quick to appreciate the commercial significance of this comprehensive plan: inasmuch as there is to-day only one cable crossing the Pacific to China. And this new, strong link of friendship cannot help but play its own important part in the cause of better understanding between these two countries, and indirectly the people of the world."

General Harbord was recently elected president of the China Society of America, an institution for the promotion of Chinese interests in the United States. For that reason, he has a special interest in the contract, from the standpoint of the far-reaching business and social influence of the Society.

Work on the stations will begin this fall, and the inauguration of service is expected during the latter part of 1925, although the plan may reach maturity before the time. Test signals will span the Pacific from China well in advance of the official opening, however.

American Appreciation and Sympathy for Japan

WHAT is said by leading Americans who had the opportunity of witnessing the work of the Japanese after the earthquake needs no comment. In addition to the words of praise by General McCoy presented in a separate article, here are a few remarkable observations, made in a statement sent to the United States by the American ambassador to Tokyo, Cyrus E. Woods. The letter from General Leonard Wood to the new Japanese Minister of War, General Tanaka, may be taken to indicate the new attitude of the Philippines towards Japan; and last—but first in character—is the message of sympathy sent by President Coolidge to the emperor of Japan.

To this list has been added two addresses, one made by Prince Tokugawa, president of the Japanese house of peers, at a simple luncheon given the American embassy and special American relief delegation at the Peers Club, one of the few club houses still standing in Tokyo. The tribute is one of the finest expressions of appreciation among the many that the Japanese have given to the American representatives. The other address was by Baron Ijuin, the new foreign minister, and is likewise conspicuons in character.

The co-operation between the American Asiatic squadron, under Admiral Anderson, and the Japanese squadron, under Admiral Kobayashi, was dealt with in the following statement which Ambassador Woods gave to the American press the day after the American fleet sailed away from Tokyo Bay.

Now that the flagship and most of the vessels of the American Asiatic squadron have taken their leave of Tokyo Bay I want to say that their coming has played a tremendous part not only in performing a great work of humanity but in demonstrating to the Japanese a sincerity of friendship that will have far-reaching effects. Our ships came of their own volition and without a moment's delay, bringing the first relief that came from abroad, and Admiral Anderson placed them at once at the disposition of the Japanese government, who in turn showed their complete understanding and appreciation and promptly made use of our service.

The co-operation between the fleets could not be improved upon. And when, on taking their leave of the premier and the naval minister, Admiral Anderson and his chief of staff, Captain Stearns, were received at the premier's official residence, the sincerity of friendship that had been established made the occasion one of the most impressive it has been in my diplomatic experience to witness.

A magnificent piece of work has been accomplished by a group of men who were willing to give with a thoroughly generous spirit, and on the other hand by a group who were willing to receive with similar grace and manliness.

This was the first time in the history of the two countries that their navies have had the opportunity to co-operate in a great undertaking. The engagement was upon a mission of peace and humanity, and service and friendship was the watchword.

The appreciation of the Japanese is profound; I hear it on every side from common people as well as officials.

Our navy prepared the way which has been made smooth and easy for the Red Cross work, upon which we are proceeding likewise with the most effective and friendly co-operation of the Japanese.

CYRUS E. WOODS.

Tokyo, September 22, 1923.

General Tanaka, the newly appointed minister of war, received the following letter from Leonard Wood, governor-general of the Philippine Islands, a personal friend, who, in his communication, gives evidence not only of the sympathy but also of the admiration of American officials who are in a position to know the stoical and philosophic character of the Japanese people:—

DEAR GENERAL,—I can't tell you how much I appreciate your telegram with its message of personal friendship and regard. I immediately wired you as follows:

> "Appreciate deeply your telegram and assure you of my deep and sincere sympathy in the great catastrophe which has befallen the people of Japan and of my desire to do everything possible to aid. Congratulations on your appointment as minister of war. I fully reciprocate your expressions of friendship regard."

We are all greatly distressed at the calamity which has befallen your people, and you can be assured that the American sentiment here is one of very deep and sincere sympathy, as is that of the Filipinos. We are all united in doing what we can to aid you in this hour of grief and sorrow.

I feel that the people of Japan are to be congratulated on your appointment as war minister.

With renewed expressions of friendship and esteem, and with kindest regards.

Very sincerely yours,

(Signed) LEONARD WOOD

(Governor-General).

The president of the United States sent to his majesty the emperor the following message through Mr. Cyrus D. Woods, the American ambassador in Tokyo :—

" At the moment when the news of the great disaster which has befallen the people of Japan is being received I am moved to offer you the most heartfelt sympathy and express to your majesty my sincere desire to be of any possible assistance in alleviating the terrible suffering of your people.

CALVIN COOLIDGE."

In appreciation of the American work, Baron Ijuin, the foreign minister, read the following address before a gathering of representative Americans brought together by the America-Japan Society of Tokyo on October 1 to a small luncheon :—

At this unusual moment, it is with heartfelt appreciation too deep for words that I greet our honored guests from the United States of America.

I was in Port Arthur at the time of the great earthquake. No sooner was I astounded by the news of the terrible occurrence than that I was gratefully impressed by the personal visit of Captain Stearns, aide to Admiral Anderson, who under instructions from his chief, offered the resources and services of the Asiatic fleet for relief of the afflicted population. The next thing I learned about the fleet was that it had cruised to Tokyo and was busily engaged in given succor to the Japanese sufferers.

What then impressed me most was the news from Tokyo. The American embassy was totally burnt down ; Ambassador Woods, his family and members of his staff narrowly escaped ; and for all that on the very next day his excellency was found energetically engaged in relief activities for the Japanese refugees in entire neglgence of his own ineffable hardships.

Another remarkable report followed. General Wood was sending a relief contingent to Japan with an enormous amount of supplies and materials. Only a few days later telegrams began to describe that a wonderful relief work was started by the American relief mission under the efficient command of General McCoy.

When I was coming to Tokyo, I also learned of the spontaneous and very generous manifestation of sympathy by the government and people of the United States proper. The relief fund drive by the American Red Cross was reaping such a great success that the original call for five million dollars had by that time been far exceeded by the subscription. Foodstuffs and building materials were quickly being shipped. Fifteen hospital units were being brought over. It was amidst such a shower of sympathy from America, as well from other countries, that I took up the portfolio of the minister for foreign affairs.

I understand that a hospital created by the American relief mission at Yokohama has recently been handed over to the Japan Red Cross Society. Two more such hospitals will also be donated to us in Tokyo shortly. Their benefit to our stricken population at this moment cannot be overestimated.

The overwhelming generosity and the wonderful promptitude with which our American friends brought us relief have ingrained in the heart of the Japanese nation a lasting gratitude.

Our reward for this great friendship from America is, to my mind, the successful reconstruction of our national capital. The Japanese people, heartened by the sympathy and good-will from foreign countries, taking to the gigantic task with determination and courage. When a new Tokyo rises from the ashes of destruction a few years hence, it will be our great pleasure to welcome you here again as our staunch friends, whose friendship was severaly tried and found not wanting.

Now, Mr. Ambassador General McCoy, and the other honored guests, let me thank you again for all you have done, are doing and will do for us and propose your health and prosperity in the interests of happy relations not only between our two nations but throughout the world.

Prince Tokugawa's statement is notable for its restraint as well as its conspicuous warmth.

I am not given much to speech-making, but there are occasions when one cannot remain silent without gross injustice to oneself and unpardonable negligence of duty. And this is pre-eminently one of those exceptional occasions.

Our pride humbled by a visitation the like of which has seldom befallen a prosperous nation, and our hearts chastened and our imagination clarified, we are now enabled to see in a new light the eternal realities of life and realize with a quickened consciousness the significance of the great lessons which our present calamity hold out to us.

One of the great truths that have been brought home to our minds in a most forcible manner, is that no disaster can ever occur which does not bring with it some compensating good, and the greater the disaster the greater the good. What could be more impressive, for instance, or more significant than the great wave of sympathy that has swayed and that still sways the hearts of mankind in all parts of the world for this stricken people of far-away Japan ? For the moment one noble sentiment unites the whole civilized world, East or West, and regardless of race or religion. Such stirringe of noble sentiments cannot fail to produce profound results in favor of human fellowship and solidality. If so the many thousands of our poor fellow countrymen who were buried dead under the falling *débris* or consumed by the raging flames have not died in vain.

Be that as it may, of one thing we are quite sure, and that is that the spontaneous and universal expression of deep and active sympathy by all the nations of the world has drawn us the Japanese people much closer to them than half a century's association under ordinary circumstances could possibly have drawn us.

And to no nation have we been drawn more closely than to the great republic on the other side of the Pacific a nation which seventy years ago rescued us from a fatal security of seclusion, which has since never grudged us help and assistance whenever we needed it in our work of modernization, and for which we all fell profound admiration and sincere friendliness. Indeed, nothing could be more gratifying and more touching than the promptness and efficiency with which the whole people of the United States have spontaneously responded to the call of human brotherliness in this moment of our need and distress.

Gentlemen, you will all agree with me when I say that the Washington conference, at which it was my good fortune to have had a humble part, ushered in a new epoch of mutual trust and friendliness among nations, especially between the United States and Japan. And now through the merciful ordering of fate we are happy to witness the memorable treaties and agreements then signed receive a fresh and double ratification by renewed sympathy on one side and by deepened and lasting gratitude on the other side.

We have lost tens of thousands of valuable lives and tens of billion yen of wealth. But in spite of the terrible losses we have sustained in these respects, we fell at this moment immensely richer than ever before in things that no amount of money, however great, can buy. We are incalcurably richer, for instance, in the greatest of all assets a nation can desire, namely, the esteem and friendship of the civilized world.

And no nation has made a greater contribution to this new spiritual wealth of Japan than the great nation whose distinguished representative has so kindly condescended to grace with his presence at our humble luncheon to-day. Mr. Ambassador Woods has been amongst us only for a short time, but it is a striking testimony of his uncommon personality that he has already won a place in our hearts which even a long resident diplomat may well envy. And he has now endeared himself to us in a much more intimate and endurable way by sharing with us, and sharing a lion's share, in all the anxieties, worries, discomforts and losses incident to being well shaken and cleanly burnt out. We are now sure that Tokyo, with its terrible earthquake and fire, will ever remain one of the most, if not the most, conspicuous landmarks in his mental vista of life experience, and we hope and trust that the ineffaceable bond that nature's rutheless dispensation has thus strangly established between him and this land of his official sojourn will remain a band of personal friendship and good-will.

It is our special pleasure and privilege to-day to have as our quests a number of prominent citizens of America who have come to us as bearers of their country's message of sympathy and help. We extend to you, gentlemen of the American Red Cross mission, our warmest welcome, and we ask you each and all to accept our most heartfelt thanks for your coming so far and so promptly to help us in the noble work of ministering to the sick, wounded and needy. The self-denying zeal and the splendid efficiency with which you are carrying out your great work commands our deepest admiration and gratitude. Your mission will long remain one of the brightest spots in the long and bright records of American help and sympathy for Japan.

Dramatic Documents

From the Government of Japan

LITTLE more than a word of explanation is needed to accompany the following documents issued by the Japanese government during the first month following the earthquake. The papers generally speak for themselves. They have a dramatic quality that shows the influence of the unprecedented catastrophe upon the minds of the men who compiled them. It will be seen that the Japanese Government was not dazed or harassed but, on the contrary, realized soberly from the beginning not only the extent of the disaster which they suffered but the effect it would have upon both the internal condition and the international position of their country.

The remarkable determination of the Japanese was noted by every unbiased foreigner capable of fair judgment. They faced a disaster suddenly put upon them without warning, striking at the very centre of their government and the metropolitan district of their industry, a disaster greater in toll of lives and in extent of damage than any catastrophe which has hitherto befallen them; and yet it was met with less disorder and more philosophy than probably any European state or the United States could have taken it.

Probably the most important, at any rate the most picturesque, documents that was issued was the imperial edict; and, at the same time, this document coming in the name of the emperor himself, is that which would naturally have the most far-reaching effect. Only in times of crisis or unusual events is such an edict promulgated. The language is conspicuously to be noted.

"Mindful of the grand examples set by our imperial ancestors and the glorious chronicles of our national progress, we have sincerely hoped to prove a worthy successor in the great task of restoration undertaken by our august father and have always exerted our utmost efforts to conduct a successful administration. It is our great fortune that, through the divine help of our forebears and the loyal co-operation of our people, we have been able to maintain our national repose and security despite the occurrence of the world war of unexampled dimensions.

Now without forewarning and suddenly there has occurred the terrible earthquake of September 1. So severe were the vibrations that numberless houses were ruined and tens of thousands of men and women perished. Fires broke out in all directions, the flames and smoke reached to the sky, and Tokyo, Yokohama, and other cities and towns were burnt to the ground overnight. All means of communications were obstructed, and wanton rumors widely circulated. The public were alarmed and excited, adding more to a disaster already of appalling magnitude. It is imagined that the catastrophe was even more tragic and ghostly than the historic occurrence of the Ansei era.

Whilst we deplore the happening of such calamity under Our own rule, it is beyond human will or effort to prevent the inexorable convulsions of nature. We consider that the only course left us now is to lose no moment in doing all that is within our power and to set at rest the mind of the people. At an extraordinary moment an extraordinary decision is needed. If we cleave fast to the rules and regulations of ordinary times and do not rise to the situation; if we fail correctly to appreciate the relative urgency and importance of needed measures; and if, at all, in an attempt to guarantee the interests of individuals or groups, the security of the afflicted many is menaced,—then the sentiments of the people will be agitated to limitless degrees. We entertain deep concern in this regard and have commanded the government officials to devise measures for quick relief, and, by providing for the urgent needs of the people, to bring our sympathy and love toward them into immediate evidence.

The city of Tokyo, being the capital of the empire, has been looked upon by the people as the centre of political and economic activities and the fountainhead of the cultural advancement of the nation. With the unforeseen visit of the catastrophe, the city has entirely lost its former prosperous contours but retains, nevertheless, its position as the national capital. The remedial work, therefore, ought not to consist merely in the reparation of the quandam metropolis, but, in ample provisions for the future development of the city, completely to transform the avenues and streets. We confidently trust that our loyal people, who always courageously proffer their services and make sacrifices for the public welfare, ardently desire, with us, to enjoy the facilities and security obtainable. We have, therefore, commanded our prime minister to establish at the earliest moment a special institution for the reconstruction of the capital, and to discuss and study the great project, which, upon completion, will be submitted to the highest body of advisers and also to the houses of the law-givers, so that there shall be no miscalculation in the conception and execution.

The government officials are charged, in application of our sincere purpose, to engage in the prompt relief of the suffering people and in the strict suppression of wild rumors, so as to inspire security in the public mind. The general nation are ordered to assist in the realization of the government's undertakings and earnestly to fulfil their duty to the public, thereby strengthening the foundations of our empire.

At this moment of catastrophe unparalleled in history our stricken heart goes out in abundant compassion to the people. Ye, our subjects, are commanded to follow our desire above set forth.

IMPERIAL SIGN MANUAL.

PRINCE REGENT'S SIGN MANUAL.

September 12, 1923.

Countersigned:

PRIME MINISTER.

OTHER MINISTERS OF STATE.

Following after the publication of imperial edict the following dramatic cabinet proclamation was put out on September 16:—

"His most gracious and benevolent majesty, the emperor, being deeply concerned over the appalling devastation wrought by the recent catastrophe, has been generously pleased first to make a grant of Y.10,000,000 out of the privy purse and then to issue an edict to indicate ways of sympathy and love toward the sufferers. Having received this august message only a few days after taking the oath of office, I am filled with trepidation, but, mustering courage, I hope to be able to put the heart of my sovereign at ease, to give security of life to the afflicted multitudes, and to devise plans for the reconstruction of the capital. The earthquake covered one *fu* and four *ken* (respectively urban and country prefectures.) The destruction was severest in Tokyo, Yokohama, Sagami, Awa, and Shimosa. Vast numbers of sufferers roam among the ruins, some with singed hair and burned skins; some had their houses burned, some lost their parents and relatives, and all, in want of food and clothes, are suffering privations verging on death. There were also a great number of sufferers amongst foreign residents, official and civil. This grieves my heart, too. At this moment, the heads of foreign states and also the officials and people of foreign countries are expressing their sympathy in deeds as well as words. With my countrymen, I feel that we cannot adequately express our sense of gratitude. I am glad that many sufferers, in risking dangers and withstanding hardships, retained their self-composure. It is to be regretted that there were some who more or less deviated from proper behavior, but they were prompted by temporary misunderstanding, and such incidents have by this time entirely ceased.

As a matter of course the government promptly took urgent measures to deal with the results of the catastrophe, declaring martial law, distributing foodstuffs, beginning the building of barracks, and suppressing to the best of their ability the circulation of wild rumors. At the same time, the people, in co-operation with the government, in great numbers volunteered to perform works of relief and benevolence. The more urgent needs were thereby met, but temporary relief does not permanently assure the livelihood of the afflicted. The government, therefore, is making every effort to recover communications, by land and water, to effect the smooth working of financial systems, in as far as the government treasury permits, and to gather the necessities of life for distribution through-

out the stricken regions. In face of such circumstances, officials and people are urged to bend to the exigencies, following the dictates of justice and humanity and assuming responsibility whenever necessary, without cleaving fast to the rules and regulations of ordinary times.

I am most anxious lest some individuals and companies shall, in trafficking in the necessaries of life, reap extravagant profits, availing themselves of the opportunity of this unexampled disaster. This is a thing, about which his majesty is deeply concerned, that ought to be discountenanced most emphatically. It is necessary that everybody be prepared to share fears and hopes with his brothers and to perform his public duty in disregard of private interests. The insurance companies, which by their nature aim to provide security for the public, should display careful consideration, and, in this extraordinary situation, evince a spirit of sacrifice, so as to requite the trust placed in them by tens of thousands of people, and thus best serve their own ultimate interests. Again, business men engaged in lumber trade and shipping will aim at the simultaneous prosperity of our brethren and make utmost efforts to distribute materials, dissociating themselves from the object of profit.

The government is to the best of its ability amassing supplies and is trying to distribute them impartially alike among urban and country districts. The local officials in whose hands the distribution is entrusted will aim at wide and quick distribution of supplies, and the general officials are ordered to perform their duties as long as their bodies and minds permit, and, especially those whose duties are to maintain public peace and order, shall take good care of the people and suppress disorderly action.

With regard to Tokio, the city was personally selected as the national capital by the late emperor at the time of his accession to the throne. Fifty-six years have since elapsed, the equipment of the city has become established, and it is the political and economic centre and the source of education and enlightenment, being looked upon as such by foreigners and Japanese alike. The nations of the world are watching our endeavors for reconstruction, and whether we succeed or fail will prove the test of our national power and ability. The rebuilding of the capital is, therefore, not merely the question of a city; it is an important national undertaking, essential in the promotion of the progress of our empire. It is accordingly necessary, in application of the emperor's purpose, to devise a project not only for the recovery of former prosperity but in anticipation of future development. For this purpose the government will newly institute a "Council for the Reconstruction of the National Capital," where wisdom will be gathered from official and private experience, and the project discussed. Later, an appropriate organ will be established for the execution of the project thus devised, and its consummation will be undertaken according to the relative urgency of the features which the plan contains. Thus a worthy national capital will be created.

In respectfully reading the imperial message, I am deeply moved and filled with gratitude at his majesty's love and benevolent purpose. It is a moment when officials and people alike should rouse themselves. On account of the long reign of peace and tranquillity, the public mind has gradually become loose and frivolous, and this untoward tendency, the result of years of deterioration, could not be turned in spite of the instructions and endeavors of a series of cabinets; and now, at this moment of unusual calamity, we are giving anguish to the imperial heart. Multitudes of our brethren in the stricken regions are separated from their blood relations; they have lost habitations and are now exposed to the elements clad in ragged garments and have for their food only a handful of unhulled rice. Such is the situation to which they are reduced. If you have sympathy, exercise frugality and live simply, warning one another to leave off luxurious living and cleave to reasonable life, and, with the power thus gained, respond to the call of the suffering, at the same time and with one mind, in co-operation, give assistance as best you can in the difficult undertaking of the reconstruction of the capital.

Thus to strengthen the foundations of the nation and to respond to the imperial purpose, this is what I sincerely desire.

COUNT GOMBEI YAMAMOTO,
Prime Minister.

September 16, 1923.

The foregoing might be described as the two great documents of the earthquake period, but there were also a number of minor papers crowded with important information. Those relating particularly to the United States include a message sent on September 6 by Count Yamamoto, the prime minister, to the president of the United States. The message began with a declaration of international policy and then made the following statement:—

"At this time a great earthquake has occurred in our capital and its vicinity, followed by an extensive conflagration, and indescribable havoc and disaster has resulted. From their majesties the emperor and empress down to the authorities and the people, all are suffering deep grief and anxiety.

"Immediately after the coming of these calamities, the commander-in-chief of the United States Asiatic squadron proposed to dispatch the vessels under his command to the districts visited by earthquake and fire to help in transportation and other work necessary for meeting the emergency, and a part of those vessels have already arrived at Yokohama.

"The government of the Philippine Islands has also ordered to come here several transports full loaded with various articles and provisions. Furthermore, the president of the United States has issued a proclamation to the American people urging them to extend aid to our people.

"These reports have already reached the ears of a large number of people suffering from misfortunes and they are deeply moved by these humane measures so promptly taken by the authorities and people of the United States on their behalf.

"At the same time, the American ambassador and the members of the staff of the American embassy in Tokyo are making self-sacrificing endeavors for the relief of the sufferers, notwithstanding the fact that the embassy buildings have been reduced to ashes; and American residents are also serving in relief work.

"For the above facts, I, representing the Japanese government, express my heart-felt gratitude to the United States government, and, at the same time, convey the warmest gratitude of our sovereign and people for the profound sympathy of the president and people of the United States.

"I wish to add that the manifestation of such genuine and cordial friendship by the government and people of the United States at this unfortunate time of calamity will further increase the intimacy of the two countries and strengthen those bonds of concord and peace that exist throughout the world."

On assuming office as foreign minister in the newly formed Yamamoto Cabinet, Baron Ijuin gave the following interview to foreign newspaper correspondents.

"Although we have been dealt with severely by the forces of nature, humanity is giving us an unexampled demonstration of its finer qualities. The stricken area of the country is receiving aid and supplies from the rest of Japan, where people are depriving themselves in order to be of assistance to their stricken brothers, while foreign countries seem unlimited in their generosity. Our whole nation is deeply touched by the sympathy that has come to us from abroad. The Japanese newspapers report daily the coming of ships bringing relief and daily increases in the funds being gathered for us in foreign countries. This demonstration of kindly human sentiment has impressed us deeply and will have long enduring effect.

It is impossible for me to outline in detail how we shall achieve the reconstruction; the task is too great. The government plans, as you know, to rebuild the capital, and we must, of course, recreate a port in Tokyo Bay. We intend to take advantage of the clearance made by the fires to lay out improved and modern cities. We shall proceed as quickly as possible to provide or promote the construction of permanent dwellings and business buildings to take the place of the temporary sheds that the people are now raising above their heads; but the execution of the whole project of rebuilding the metropolitan area will require many years and will cost enormous sums of money, and such a program must be undertaken only after most careful consideration by technical experts in the many branches of municipal and general government science. Happily, we are assured of whatever financial and other help that we may require from abroad.

It is fortunate for us that our foreign relations are in the best possible condition. We have no serious issue before us and we foresee none in the future that will embarrass our good relations with

any country. It is most satisfactory to me, on assuming the post of foreign minister, especially at this peculiar moment, that no change in our tested and pledged policies are advisable or contemplated. The present government approves of the policies laid down by our predecessors at Paris and Washington, and I am happy to say that the country as a whole overwhelmingly supports those policies. It is my purpose to continue them and to strive to make permanent the clear understanding that we have reached with the great powers both in our relations directly with them individually and in our co-operation with them collectively where our interests are general.

There is only one blemish in the situation. That was the absurd scare which was circulated among the Japanese that the Koreans were taking advantage of the situation to throw bombs and make other attacks. It is said that this ridiculous rumor was launched by the Young Men's Society of Tokyo, which, in turn, is said to be one of the institutions inspired by the old militaristic devices. The result of the report was that a number of individual Koreans were attacked and wantonly slain. It is difficult to ascertain how many were killed, but it would seem that a score would more than cover the number. At the same time a number of Japanese were mistaken for Koreans and lost their lives. The government immediately realized the seriousness of the error and issued on September 5 the following cabinet proclamation, also issuing orders to the military authorities to give protection, which was at once provided; and the Koreans thereafter were amply protected.

"It is understood that there are some citizens who entertain unpleasant feelings towards Koreans on account of alleged disorderly acts by some Korean malcontents, who took advantage of the recent seismic disaster. In case any Koreans are found in the act of menacing performance, notification shall immediately be made to the military or police officers in charge of the district, who will take the necessary measures in the matter. That the citizens themselves should thoughtlessly persecute Koreans is entirely in contravention with the basic principle of Japanese-Korean assimilation and further would bring blemish upon our honor when reported abroad. Such uneasiness of mind has no doubt been brought about by the sudden and difficult situation, but it is my ardent desire that our people will, at this extraodinary moment, maintain their usual composure and exercise special care in their actions in keeping with their spirit of self-restraint and love of peace and justice.

I express my sincere wish, with all the emphasis at my command, that every one should absolutely refrain from thoughtless actions and preserve their self-respect.

COUNT GOMBEI YAMAMOTO,
Prime Minister.

Reconstruction of Tokyo

IT was only natural that the first news of the disaster to the national capital would be taken advantage of by Kyoto to advance its claims for special recognition as the seat of government and by Kobe to advertise its advantages as the chief shipping port to supercede Yokohama. To the minds of dwellers in other cities it looked during the first week of the disaster as though the capital would have to be transferred, pending reconstruction at least, but as the people began to recover from their first depression and took stock of their assets, it was quickly realized that any change in the seat of government would be a mistake, and by common impulse the plans for reconstruction were pushed forward. The great opportunity had arrived to carry out some of the plans drawn up last year for the construction of a Greater-Tokyo and place the capital on a par with other great cities of the world, boasting wide streets, sanitary improvements and up-to-date buildings. The preliminary studies for the improvement of the capital had been carried out last year when Dr. Beard, the American municipal and town planning expert, spent several months in Tokyo at the invitation of Viscount Goto, and the clean sweep of the conflagration in several of the principal wards of the city provided the opening to initiate improvements that under normal conditions would have necessitated huge outlays of capital for the purchase or expropriation of property. It did not take long for the higher authorities and business interests to decide that Tokyo would remain the capital and seat of financial, economical and commercial activity and formulate their plans for reconstruction. The first step towards this end was the creation of a supreme organ for the restoration of the capital composed of a commission of twenty members under the direct control of the emperor with an advisory and executive body to carry out the plans passed by the higher commission.

The official announcement giving details as to the powers and *personnel* of the capital restoration commission was made on September 16, in which it was decreed that the commission is to answer the inquiries made by the premier regarding the restoration of the devastated capital and other regions. It is to be presided over by the premier, assisted by a chief secretary and several other secretaries of the commission.

The members are to be chosen out of the ministers of the empire, former ministers, and officials who were appointed by the emperor and others who are eminent in scholarship and experience. They are to receive similar treatment as ministers of the empire.

The following persons were selected by the government as members of the commission:—

Count Gombei Yamamoto, premier and foreign minister.
Viscount Shimpei Goto, home minister.
Mr. Junnosuke Inoue, minister of finance.
Baron Giichi Tanaka, minister of war.
Dr. Keijiro Okano, minister of education.
Admiral Takeshi Takarabe, navy minister.
Baron Den, minister of agriculture and commerce.
Mr. Tsuyoshi Inukai, minister of communications.
Mr. Ichiji Yamanouchi, minister of railways.
Dr. Kiichiro Hiranuma, minister of justice.
Count Miyoji Ito, privy councillor.
Viscount Keigo Kiyoura, president of the privy council.
Viscount Korekiyo Takahashi, president of the Seiyukai.
Viscount Takaakira Kato, president of the Kenseikai.
Mr. Yukio Ozaki, leader of the Kakushin Club.
Mr. Masami Oishi, former minister of agriculture and commerce.
Viscount Eiichi Shihusawa, veteran businessman.
Mr. Toyoji Wada, president of the Fuji Spinning Company.
Dr. Takuma Dan, of the Mitsui Bussan Kaisha.
Mr. Otohiko Ichiki, governor of the Bank of Japan.
Viscount Nobumitsu Aoki, of the Kenkyukai.
Mr. Kazuyuki Egi, of the Chawakai.
Baron Hisaya Iwasaki.
Baron Ijuin, foreign minister.

Premier Yamamoto is president of the commission, and Viscount Goto, chief secretary.

Mr. Seiji Tsukamoto, vice-minister of home affairs, Mr. Sukehide Kabayama, chief secretary of the ministry, and Dr. Joji Matsumoto, newly appointed chief of the bureau of legislation, were selected as secretaries to assist Viscount Goto.

The regulations governing the operations of the commission consist of twenty-six articles. The first article provides that the board be under the direct control of the prime minister and execute all matters relating to the town planning and reconstruction of Tokyo and Yokohama.

The second article fixes the officers of the board as follows:

President, 2 vice-presidents, 1 chief engineer, 7 managing chiefs, 15 secretaries, 30 attaches, 105 engineers.

The third article provides that the board consists of six bureaus, namely planning, land readjustment, construction, public works, supplies and management.

In addition to this the secretariat of the president will belong to the board.

The article provides for the establishment of a council board. This council will consider important matters when submitted by the president. It will consist of one president and several members. The members of the council will be appointed by the cabinet through the recommendation of the prime minister.

The regulations were put into operation on the same date as published.

The following *personnel* of the executive board having charge of the direct work of capital reconstruction was announced on October 2: President, Viscount Shimpei Goto; Vice-Presidents, Shunji Miyao and Kan-ichiro Matsuki; Director of the Planning Bureau, Hiroshi Ikeda; Director of the Land Readjustment Bureau, Shunji Miyao; Director of the Construction Bureau, Riki Sano; Director of the Bureau of Public Works, Rintaro Naoki; Director of the Bureau of Supplies, Kan-ichiro Matsuki; Director of the Accounts Bureau, Shinji Tokawa; Chief Engineers, Yenzo Ota and Hakuai Yamada.

The yearly expenses of the board is placed at Y.1,200,000.

The board started work on October 2 and one of the first signs of its activities was the submission of a complete plan for the reconstruction of Tokyo by Mayor Nagata. The scheme calls for a total expenditure of Y.2,350,000,000 covering a period of twenty years. In the event of establishing new additional parks and constructing ward offices the sum is expected to reach between Y.2,500,000,000 and Y.2,600,000,000.

The general policy is to have a network of rapid-transit subway lines constructed, starting from the points on the boundary line between the city and "guns" (counties) and concentrating around Marunouchi in the neighborhood of Tokyo station, like a spider's web. Canals and streets are to be readjusted, in order to facilitate traffic. The present surface street car lines shall be extended. In addition, four new lines shall be constructed, leading to Shinagawa, Shibuya, Meguro, Shinjuku, Ikebukuro, Otsuka, or Sugamo and Fujagawa districts, and also a rapid-transit car line laid down from Senju to Shibaura and Tsukishima, to connect with the surface lines.

The imperial railway ministry shall be requested to complete the work of constructing elevated lines between Manseibashi and Ueno stations, and between Ryogoku and Kanda stations. Starting from the Honjo and the Koume stations of the Tobu Railway, car lines shall be constructed to facilitate connections between street cars and steam railways at Ryogoku station.

In addition to the surface system, the following under-ground tram lines, viz., Shinagawa reclaimed ground—Kanegafuchi, Gotanda-Senju Ohashi, Yebisu-Sugamo, Shibuya-Susaki reclaimed ground, Ehinjuku-Sunamachi, Ikebukuro-Kameido, aggregating 52.7 miles, will be laid at a cost of Y.210,000,000.

To Widen Canals

The canal system will be improved for a length of 57,540 *ken*, of which 6,150 *ken*, 36,870 *ken* and 14,520 *ken* will have a width of 20, 30 and 50 *ken* respectively. The total cost is estimated to reach Y.290,000,000.

According to the said plan canals (20 *ken* wide) will be constructed between the mouth of the Furukawa canal and Shinohashi as well as between Furukawa bridge and Shibaura, whereas the Shiodome canal will be extended to Toranomon and made so as to flow into the Sumida river at Hamacho Nichome after connecting at the outer moat (Sotobori) and Shibaura.

Other improvements in the canal system will be the widening of canals as follows:—the Nihombashi canal to 50 *ken*, the Kyobashi, Ryukan and Hamacho canals to 30 *ken*, the mouth of the Kanda canal to Manseibashi bridge to 30 *ken*, the Onagi canal to 50 *ken*, as well as the lengthening of the Nishidome canal to flow into the Kanda canal, the extension of the Ryukan canal to Mikuramae Katamachi with a width of 30 *ken* and the branching of the said canal at Katamachi to the Sumida river and Mikawajima at a width of 50 *ken*, the extension of the Sanya Horikawa canal to Oji (30 *ken* wide), the widening of the Tategawa canal to 30 *ken* as well as the joining and widening of several other canals in the Sumida district.

In addition to the existing parks, the broad open space in front of the imperial palace at Marunouchi, as well as the Hama detached palace, the Otsuka munition depôt, the Gokokuji temple, the Zoshigaya cemetery, the Meiji shrine grounds, the Aoymaa cemetery, the military cadet school at Ichigaya, the botanical gardens at Koishikawa, the Fukagawa branch of the military arsenal, Baron Iwasaki's estate will also be made into parks. Furthermore parks will be established on the bank of the Sumida river at Hamacho, as well as near Tengenji, Shinohashi, the upper source of the Edogawa river, Surugadai, and at Mukojima, the site of the military clothing depôt in Honjo, the Sanno hill at Akasaka, the Toyamagahara plain, and Tsukudajima, which will bring the total area of parks up to 2,850,000 *tsubo*.

The sum of Y.140,000,000 has been put aside for the purchase of 922,000 *tsubo* of personal estate in order to materialize this plan.

To Build Harbor

As regards harbor works the former municipal budget estimate of Y.72,000,000 will be increased to Y.100,000,000 in order to allow of the free entry into Tokyo harbor of vessels of 10,000 tons.

The sum of Y.100,000,000 will be required for various underground structures which may, however, be possibly increased to Y.300,000,000.

As for waterworks the extension of the present municipal waterworks system will necessitate an appropriation of Y.70,000,000, and Y.150,000,000 will be required for improvements in the sewage system of the city.

The central municipal market will be established on the site of the naval academy, and branch markets at Ryogoku bridge, Akihanohara, Ikebukuro, Shinjuku, Shibuya, Osaki and Shinagawa.

According to the new reconstruction plan, the area of canals in proportion to the area of Tokyo will be increased from 5 to 9.6 per cent., that of streets from 16.1 to 24.3 per cent. and that of parks from 2.3 to 11.5 per cent.

Streets

On the surface over the subway lines, trunk street lines shall be constructed emanating in all directions from the centre of the city in Marunouchi. This plan was embodied in a plan before the earthquake made for the improvement of Tokyo. The width of the streets shall be increased between 144 and 240 feet. The proposed Maki-cho street, 168 feet wide, shall be widened to about 360 feet.

Other trunk lines are to be constructed from Shinagawa to Minowa and to Senju.

The Ginza and Nihombashi streets are to be left as they are. A trunk line shall be constructed along Sanjikkenbori, parallel with the Ginza line, joining at Kanasugi Bashi to lead to Shinagawa.

The outer-moat line between Akasaka Mitsuke and Kagurazaka shall be left as it is, while in other parts the street shall be widened to 120 or 180 feet.

Nothing definite has been decided about the streets between the Detached Palace to Shiba Park, between Roppongi and Shinanomachi in Yotsuya-ku, and other encircling lines, connecting Yanagimachi, Ushigome, Vegetable Garden, and Hakusan, in Koishikawa-ku, etc.

Broader Streets Planned

The street improvements will consist in the widening of the main thoroughfare from Shinagawa to Seiju via rear of Tokyo station and Uyeno Park as well as the Makicho route and the thoroughfare from Mukojima Ukechi to Manseibashi bridge via Ryogoku bridge to 40 *ken* wide at an estimated cost of Y.1,100,000,000. The construction of streets will extend over a length of 163,590 *ken*, which, when divided into the various widths will be :—20 *ken* wide 75, 420 *ken*, 25 wide 32,970 *ken*, 30 *ken* wide 43,500 *ken*, and 40 *ken* wide 11,700 *ken*.

Freight Stations

The policy of establishing freight stations at Konakigawa, Minami Senju, Shinagawa, Shiwodome, Takata-no-baba, Tabata, making those places switching stations, is for the Imperial Railways to decide.

Markets

A large public market shall be erected on the former site of the naval arsenal in Tsukiji, to which freight tracks may be built from Shiwodome and Shinagawa stations.

The carrying out of these plans over a period of fifteen years at an estimated cost of three billion yen will call for financing at the rate of Y.200,000,000 a year. In discussing the program to be followed, the board made the following statement at the privy Council :—

" Three plans may be formed with regard to the reconstruction. To place the capital on its pre-earthquake basis by the restitution of the prefectural public works, private companies, banks and individual enterprises, roughly about Y.5,000,000,000 will be required. If the reconstruction work is to be limited to the prefectural and provincial public works about Y.3,000,000,000 will suffice. For the reconstruction of prefectural public works alone about Y.1,200,000,000 will be required."

The first question to be settled in any scheme for the reconstruction of Tokyo and Yokohama is that of finance and here there are various opinions, some holding to the view that the money can be found within Japan, while others are decidedly in favor of raising foreign loans. The domestic resources will undoubtedly be drawn on to the fullest extent but the opinion now seems to have solidified in favor of going abroad, especially to America, for financial assistance. While it is too early to state with any exactitude what the financial program will be, it is accepted that when the time arrives a mission will be sent to America and England to negotiate the loans. It is reported that this mission will include Mr. E. Fukai of the Bank of Japan, Mr. R. Ichinomiya, vice-president of the Yokohama Specie Bank and Mr. E. Ono, governor of the Industrial Bank of Japan.

One of the first problems to be settled before any loan policy can be adopted is whether the cost of reconstruction is to be paid out of the municipal, county or national treasuries. In view of the great dimunition in the municipal revenues of Tokyo and Yokohama, there would seem to be little likelihood that these communities can find the necessary guarantees for any foreign loans thus throwing the burden of financing the reconstruction upon the imperial government. Yokohama has ceased to exist as a self-supporting community while Tokyo has met with such a serious setback that it is hardly in a position at this time to formulate its budget. As the result of the destruction of the business sections of the capital, which represented more than one-half of the total tax revenues, no levy is possible under present conditions. The returns from the water system, tramways and other sources will all experience a great decrease. According to the investigations of the home office, the estimated Tokyo revenues for 1923 from house taxes and school fees was Y.2,695,709 which has now been reduced to Y.876,641 or 65 per cent. The city of Tokyo had outstanding at the end of 1922 the following debentures :—Y.173,936,116 ; sterling, £5,553,160, Francs 91,895,500. Yokohama debts exceed £1,000,000 sterling and Y.26,000,000. With nothing to meet these obligations, the national treasury will be compelled to shoulder all the expense of reconstruction, in which case, the privileges of self-government in Tokyo and Yokohama, will have to be suspended as far as their loan-making powers are concerned.

The shrinkage of revenue in consequence of the government's cut in taxes and suspension of import duties and other causes is expected to amount in Tokyo alone to Y.130,000,000 of which income taxes (third class) occupy Y.40,000,000, business taxes Y.20,000,000 and land and inheritance taxes Y.60,000,000. In order to meet this financial emergency the diet will be convened in extraordinary session in November, when the cabinet will ask its approval for the large expenditures for reconstruction instead of acting on its own responsibility, as well the extraordinary expenses incurred in relief work.

An immediate feature of reconstruction is the immense amount of *débris* that must be carted away, for which the Tokyo authorities have asked the government to appropriate Y.12,000,000 without delay. It is proposed to fill in and raise the ground level in the low lying districts in Honjo and Fukagawa with the *débris* of the burnt sections. This will call for an immediate increase in the transportation facilities, and create a market for trucks and dump cars that will probably be served from abroad.

Destruction of Property

MANY rough estimates of losses have been made by government bureaus and private concerns which in most cases are under, rather than over the actual figures being based on building costs when the structures were erected. Preliminary estimates are therefore very wide of the mark, and until sufficient time passes for an expert survey the first rough estimates are the only indication we have as to the value of actual property destroyed. The home, finance, war, navy, education, justice, agriculture and commerce and the Communications Ministries estimate their actual building losses in Tokyo, Yokohama and Yokosuka at Y.78,777,000. Reconstruction at present labor and material prices will call for at least ten times that amount.

The direct damage to the imperial government railways through destruction of stations, freight sheds, collapsed tunnels and rolling stock is placed at the rather low estimate of Y.35,000,000, while the decrease in operating revenues due to these causes is placed at Y.20,000,000. As a result, the railway authorities who have been pushing ahead elaborate plans for the electrification of the Tokkaido line under a five year program have been compelled to radically modify their plans and suspend for the time being all new construction.

The damage to the railway in the Tokyo zone alone is as follows :

Stations Destroyed by fire—Yuraku-cho, Shimbashi, Hamamatsucho, Kanagawa, Yokohama, Sakuragichi, Kanda, Manseibashi, Ochanomidzu, Suidobashi, Iidamachi, Uyeno, Akibahara, Ryogoku, Kinshicho.

Stations Collapsed :—Ofuna, Fujisawa, Hiratsuka, Oiso, Chigasaki, Shimosoga, Matsuda, Hayakawa, Nebugawa, Odawara, Tsujido, Ushigome.

Railway Bridges Destroyed :—Banyu, Rokugo, Arakawa, and Tone rivers.

Tunnels Collapsed :—Tunnels Nos. 2, 3 and 4 between Yamakita and Yaga, between Totsuka and Hodogaya, two places at Shimidzudani, between Dzushi and Taura, 3,500 tsubo at Yoshikura, between Aibara and Hachioji, 1,700 tsubo at Aibara, between Odawara and Manazuru, between Komine, Hayakawa and Nebukawa, between Yonegamiyama, Nebukawa and Manazuru, between Kanjo and Nagasaka, between Hamaganedani and Hoda, between Soga and Otsuna, between Iwai and Tomiura and at Kanaya.

Cars and Locomotives Destroyed by Fire :—Bogey cars 284, ordinary passenger cars 102, freight cars 817, locomotives 33.

Tokyo Water System

The Tokyo water system was so damaged by the quake that the repairs will extend over a period of three years at an estimated cost of Y.10,000,000. The quake destroyed the mains in over a thousand places loosening the joints and breaking the pipes to an extent that entirely new pipes will have to be laid in many sections. The lesson of the fire is that a new reservoir must be built at Arakawa to supplement and reinforce the existing one at Murayama and provide two sources of supply instead of one. In order to make the fire defense perfect it is also proposed to lay a complete independent fire service drawing water from the rivers and canals. The frequency of quakes is a standing menace to the water supply and there seems to be no escaping the certain penalty when fire breaks out after an upheaval. As a partial remedy, a separate fire main system will be installed at an estimated cost of Y.5,000,000.

Cotton Mill Losses

The quake and fire damage to Japan's cotton spinning industry is now believed to be about 28 per cent. of the pre-quake spindle capacity. All mills suffering injury are conducting investigations to ascertain the extent of damage and in some cases perfect secrecy is maintained on the result of their finding. The following may give a general idea :

Entirely Destroyed by Fire

Co.'s	Mills	Spindless
Dai Nippon Spin. Co.	Fukagawa	43,396
Odawara Spin. Co.	Main plant	30,720
Fuji Gas Spin. Co.	Oyama No. 3	40,000
,, ,,	Oyama No. 4	44,288
,, ,,	Oshiage	80,524

Crumbled

Toyo Spin. Co.	Oji	66,464
Hattori Spin. Co.	Yokohama	11,304
Tokyo Spin. Co.	Nishi Arai	23,600
Nisshin Spin. Co.	Kameido No. 1	59,152
Kanegafuchi Spin. Co.	Tokyo No. 1.	30,440
Fuji Spin. Co.	Oyama No. 1	30,192
Fuji Spin. Co.	Oyama No. 2	52,472
Sagami Spin. Co.	Hiratsuka	76,184

Partly Damaged

Dai Nippon Spin. Co.	Hashiba	101,336
Kanegafuchi Spin. Co.	Tokyo No. 2, 3, 4, 5	93,404
Fuji Spin. Co.	Onagigawa	13,824
Fuji Spin. Co.	Kawasaki	111,224
Nisshin Spin. Co.	Kameido No. 2	52,996
Tokyo Muslin Co.	—	52,064
Tokyo Muslin Co.	—	108,810

The following table shows the damage done to spindles :—

	Entirely destroyed	Totally crumbled	Partly damaged
Under 20's counts	64,800	52,005	84,144
From 30's to 42's counts	114,424	141,404	297,902
Gassed yarn	29,480	100,131	93,372

The total number of spindles thus damaged reaches 977, 669, and that approximate 20 per cent. of all the spindles in operation in this country. The monthly capacity of all the spindles damaged is estimated as follows :—

	Entirely damaged (Bales)	Totally crumbled (Bales)	Partly damaged (Bales)
Under 20's counts	3,240	2,600	4,207
Over 30's to 42's counts	3,432	4,242	8,937
Gassed yarn	153	520	486

Machines Damaged

The number of weaving machines affected by the disaster is reported slight, apart from the total loss of the 300 looms belonging to Odawara Spinning Company, the works partly damaged were as follows :—

402 looms in the No. 2, No. 3, No. 4, No. 5 works of the Kanegafuchi Spinning Company ; 692 looms in the Onagigawa works of the Fuji Gas Spinning Company ; 1,568 looms in the No. 5 Oyama works of the Fuji Gas Spinning Company ; 329 looms in the No. 2 Kameido works of the Nisshin Spinning Company ; 1,638 looms in the Azuma works of the Tokyo Muslin Company ; 500 looms in the Tokyo Muslin Company.

Raw Cotton Short

Many companies, who used to get supplies of raw cotton through Yokohama are now in a quandary. The following table shows such companies with their respective numbers of spindles :—

Co.'s	Mills	Spindles
Daido Spin. Co.	Kawagoye	10,100
Daido Spin. Co.	Koku	2,720
Asahi Spin. and Weav. Co.	Sendai	25,224
Ashikaga Spin. Co.	Ashikaga	15,000
Nagoya Spin. Co.	Koriyama	8,800
Nagoya Spin. Co.	Niigata	24,784
Sanko	Head works	15,000
Toyo	Kuribashi	6,000

Of all these spindles, 208,704 cannot be restored and the restoration of spindles in the works which have totally crumbled will take more than a year. Partly damaged works will be repaired in about 6 months. Considerable activity is displayed in placing orders for new equipment.

Industries Affected

Although the industrial heart of Japan is in and around Osaka many large manufacturing plants were located in the Tokyo and Yokohama districts and these suffered huge losses through complete or partial destruction, paralzing their earning capacity and output until such time as they can be rebuilt. In many cases, this means at least a year for reconstruction of the buildings, and although in some cases much valuable machinery has been salvaged, at least half the equipment will have to be replaced. These companies face a difficult prospect in raising new capital for reconstruction as the issuance of debentures within the country is regarded as being utterly hopeless forcing them to seek financial assistance from abroad. As a result, some concerns have already approached the minister of finance for permission to import foreign capital, but until such time as the government formulates its own financial policy and estimates its requirements from abroad for reconstruction, there is little hope that such permission will be granted. As the importation of foreign capital is expected to amount to a considerable sum in the next year or so, the government is not inclined to concede permission for private loan issues on foreign money markets that will hinder the more urgent and important official operations.

The following list of industrial losses covers some of the more important companies :

Dai Nippon Sugar Manufacturing Co.—The branch office in the Kakigara-cho, Tokyo, burned down and the Sunamachi works collapsed. The loss of the stock was slight.

Yokohama Kiito Kaisha.—The office in Yokohama, and a considerable amount of stock having burned, the total loss is estimated at Y.2,000,000. But the raw silk stock stored in the basement of the building of the company is expected to be safe. A provisional office was opened at the Mitubishi Shoji Kaisha's office.

Tokyo Keori Kaisha.—The Oji works suffered worst, while the damage to the Senju works was slight and operation is already going on.

Yensuiko Sugar Manufacturing Co.—The branch office of this company and the stock kept in the Mitsubishi, the Toshin, and the Teikoku Warehousing Companies were burned. The works, however, are in Osaka and Taiwan, and the producing capacity is unaffected. The works are reported as being operated at full capacity.

Nisshin Cotton Spinning Co.—The branch office in Kakigara-cho, Tokyo, was burned, and the first works of the Kameido factory crumbled. At present, the clearing of the wrecked buildings and the repairing of machinery are in progress.

Meiji Sugar Manufacturing Co.—The Kawasaki factory was burned down, and the stock lost amounts to about Y.400,000.

Nippon Kinema Co.—The total loss is estimated at Y.3,000,000. More than two-thirds of all the motion picture houses in Tokyo and Yokohama controlled by the company were destroyed, and the rest of them cannot be used for the time being.

Nippon Yusen Kaisha.—The building of the head office was damaged, and the branch office at the Kyobashi was burned down, but no ship was lost.

Asahi Petroleum Co.—Only the Oshima factory of this firm has been affected, but, the transportation of goods to Tokyo having stopped, transactions in oil are now at a standstill.

Niigata Iron Works.—The head office and the Tsukishima Works of this company was entirely destroyed by fire, and the Shibaura Works was damaged by the earthquake. After slight repairs, however, operations will be resumed ere long. The total loss is estimated at Y.600,000.

Oji Paper Manufacturing Co.—The Oji and Juji factories and the head office were burned down, and the aggregate loss is estimated at Y.3,500,000. At present, this company has opened a provisional office in the Imperial Hotel. The Oji factory will resume operation within this month, and the Jujo factory within two weeks.

Nippon Flour Mill Co.—The damage of the Oyama, Yokohama, and Kanagawa works of this company is estimated as amounting to Y.50,000,000. The Komatsugawa and the Toa Mills being untouched, the production is not expected to diminish very much.

Fuji Paper Manufacturing Co.—Though the head office of this company was lost, the damage to the Senju and the Edogawa factories having been slight, the production will be kept up in the same works as well as in the Shizuoka, Hokkaido, and Hyogo works of the company. A provisional office was opened at the Okawa-Tanaka Office, Marunouchi.

Asano Cement Co.—The total damage done on the Fukagawa and the Kawasaki works of this company reaches Y.3,500,000, and approximately Y.650,000 of raw and finished materials were lost. But orders will be filled from the output of the Moji, Taiwan, and Hokkaido works. As the demand for cement in reconstruction is expected to be active, the prospects of the company are considered improved. The Asano Slate Company in Fukagawa-Ku was also destroyed.

Nippon Petroleum Co.—This company's Yukakukan Building, factory in Narihira Cho, Honjo-ku, and Tsurumi works were damaged. The locality, in which the company's oil wells are situated was comparatively unscathed, so business will open from September 17. The damage is estimated at Y.300,000.

Hokkaido Coal Mine and Steamship Co.—This concern has opened a provisional office in the Kuhara Building. Owing to the destruction of branches in Tokyo and to the difficulty in transportation, actual business has not yet begun.

Asahi Glass Co.—The total damage is now under investigation. Reconstruction of the Tsurumi works has been started. Business was opened on the fifth story of the Industrial Bank building.

Dai Nippon Artifical Fertilizer Co.—The head office in the Industrial Bank Building was untouched. The Yokohama, Koyasu, and one other works were destroyed, the aggregate damage being estimated at Y.4,000,000. The Kinoshita, the Oji, and the Komatsugawa works will be operated at full capacity.

Nisshin Flour Mill Co.—The head office was burned down, and a part of the storehouse attached to the Yokohama works has crumbled. The production at present is 500 barrels in Kanto, and 2,500 barrels in Kansai.

Ishikawajima Dockyard Co.—A part of the office and the dock were destroyed; most of the machinery, however, is safe. The aggreagate damage is expected to reach an enormous sum. From about the middle of October, operations for the construction of bridges will be started.

Uraga Dockyard Co.—The works of this company was burned down, but the docks were not affected, and no damage to ships under construction was reported. The total loss is estimated at about Y.1,000,000. Operations will be begun from towards the end of October.

Toyo Muslin Co.—The third and the fourth factories crumbled, and the second was slightly damaged. The aggregate loss is expected to amount to an enormous sum. The Shizuoka Works of this company has already started operations.

Nippon Hemp Co.—The Omiya works was safe, but the Akabane factory, the mainstay of the concern, having been greatly damaged, the resumption of operations will take a long time.

Government Printing Plant

The government has decided to construct an emergency printing office at a cost of 900,000 yen, the sum to be made available by discretionary disbursements.

With the burning of the government printing office building, with all its machinery, the government authorities are meeting no little inconvenience, and various plans have been made to rush the restoration of the printing office. The total cost of completely restoring the building is estimated at Y. 20,000,000 which sum, the authorities think, is not available at the present time.

Japanese Steel Situation

Industrial circles are entertaining an optimistic view of the future condition of structural and other steel materials and the consensus of opinion at this moment is that the iron and steel market here will not witness unduly inflated prices.

With the exception of the Kawasaki mills of the Nippon Steel Tubing Company and the plate mill of the Asano Shipyard Company both of which are crippled, damage to nearly all steel works in the affected area is surprisingly unimportant. Even the Nippon Steel Tubing Co. contemplate resuming production by the end of this year at the full capacity of 8,000 tons a month.

It is surmised that the Yawata Iron Works will concentrate their efforts on the manufacture of structural steels, while all the other steel mills are not expected to lag behind unduly in the production of these materials.

Beside this, the speculation that there will be an influx of American steel materials to the extent of 150,000 tons, taking advantage of the lifted import duty, is encouraging this viewpoint.

Flour Mills to Resume

The damage sustained by the flour mills is estimated at Y.1,000,000. The destruction of machinery of the Nippon Flour Mill at Kanagawa, the pillage suffered by the Nisshin Mill at Kanagawa, and losses of profit due to the suspension of work for ten days by other companies are some of the largest items. The Oriental Flour Mill (3,000 barrels) and the Nippon Flour Mill (150 barrels) at Onagigawa, the Matsumoto Flour Mill at Chiba (500 barrels) are intact, and running their factories with the usual efficiency. The main problem is the supply of wheat.

Standard Oil Losses

The Standard Oil Company is probably the heaviest loser among foreign companies. Eight oil tanks at Kanagawa, a reservoir for the supply of the whole East, exploded, the loss in this alone being twenty million yen.

Government Lumber Mill

The government is exercising its best effort in encouraging the production of worked lumber by advancing money at low interest to such lumber mills as are temporarily incapacitated by the quake and fire. On the other hand, the government intends operating a lumber mill in an extensive scale appropriating Y. 4,000,000 for this purpose. The enterprise will come under the jurisdiction of the capital reconstruction board.

Telegraph and Telephone Losses

The department of communications was seriously hit by the earthquake and fire. The total loss is estimated at Y.300,000,000. The repair work on telegraph and telephone lines alone will entail a cost of approximately Y.250,000,000.

The number of telephone subscribers in the devastated area of the capital was reported to be 62,000 and although the authorities are busy towards the re-establishment of the services only one-half will be repaired before summer of next year.

Work on the repair of Yotsuya, Asakusa, Marunouchi and Sumida telephone exchanges is going on rapidly. A number of the telephones attached to other exchanges are at the same time being connected with the four exchanges which are at present in operation. Stress is being made in permitting the large governmental, financial, industrial and commercial organization the use of the means of communications for it will enhance the revival of the economic activities of the capital.

While making the repairs just described, the authorities have decided to install a number of public telephones attached to the post offices to be constructed in the devastated districts so that residents have the use of them.

In the restoration of the telephone and telegraph communications, the government is handicapped by the collapse of the great works of the Nippon Electric Company, whose new reinforced concrete structure came down at the first crash. Although much of the machinery and some of the stock has been salvaged, the buildings are a total loss holding up production until a new works can be erected. In the meantime telephone apparatus will come largely from America.

Tokyo Tramways

One of the marvels of the aftermath of the disaster was the prompt and efficient restoration of the Tokyo tramway services which within three weeks had most of its lines south of the Sumdia River in operation. The municipal electric bureau lost in the recent catastrophe 820 tramcars, several transforming stations and over 80 miles of overhead wires. At present the street tram service is maintained with great difficulty with about 400 cars for sections covering about 80 miles. The number of passengers using the tram service exceeds 800,000 a day. The recovery of the street tram system to its former status will require several months.

In order to relieve further the congestion of traffic and facilitate transportation into the burned districts of Honjo, Fukagawa and Akasaka, the municipal council passed a bill for the establishment of

a municipal motor bus service as an auxiliary transportation organ. The plan was proposed by Mr. Nagao, director of the municipal electric bureau, and will be carried out without delay as soon as approved by the assembly. The scheme is to save the congestion on trams.

The bill provides for Y.2,000,000 and the greater portion of the amount is to be expended in the purchase of 1,000 passenger cars each accommodating 12 passengers. These cars will cost Y.1,850 each and will be ordered from the Ford Automobile Company of America.

Tokyo Bridges

The transportation problem is made more difficult by the destruction of bridges throughout Tokyo. About 300 bridges of all types were either destroyed by the quake or wiped out in the conflagration. By the first of October only about 70 temporary structures had been erected in their place. The dearth of timber is greatly handicapping their replacement and whatever bridge work is done at this time to relieve the transportation tangle will have to be replaced later on by permanent structures. Much of the great loss of life during the conflagration is traceable to the destruction of the many wooden bridges which prevented the people from flying to the safer districts of the city, and any plan for permanent reconstruction must include either steel or reinforced concrete bridges that will assure at least a safe passage across the numerous canals for the people in the event of a future calamity.

Underground Railway Project

As a part of the plan towards reconstructing the capital, the members of the Reconstruction Committee are contemplating starting work on the underground railway. The first plan included the building of six lines extending fifty-three miles, at a cost of two hundred million yen.

Building Losses

It is perhaps too early to offer any serious comments from the lesson taught by the recent disaster on the style of structure best adapted to stand the effects of earthquake and fire. In due time we hope to present the full report of competent experts on the building problem, for the present confining our comments to the lessons which seem to stand out so that even the layman can profit by them. Building destruction by the quake itself was not confined to any particular style or type of architecture. The first great shake found the weak joints in Japanese and foreign style buildings alike and sent them crashing to the ground. Most of the Yokohama edifices erected a generation or more ago, went at the first tremor, while in Tokyo buildings of the same age built of brick and wood in many cases stood the shake admirably. The older brick office buildings in the Marunouchi district remained intact while many of the newer ones had their facings cracked or shaken down. The newer damage done to the steel frame structures erected in the past decade was slighter than in other buildings. The outside curtain or facing of brick or terra cotta, suffered in many instances and the inside partitions and walls were destroyed, but this was merely superficial damage which can be repaired at slight cost. The steel frame structure with concrete floors stood the earthquake test, but where the fire got inside, were licked clean of all woodwork. In the Marunouchi district these buildings have suffered only superficially, while in Nihonbashi and other districts swept by the flames they were gutted and left bare, with the stone facings cracked and melted by the intense heat. Examples of these buildings are the Marunouchi, the Nippon Yusen Kaisha, the Nippon Oil and the Tokyo Kaijo damaged only on the surface, while other buildings of lesser height came out uninjured. Of these, special mention must be made of the Tokyo Central Railway station and the Imperial Hotel. On the other hand many of the purely reinforced concrete type collapsed like a house of wood at the first severe shake. Examples of the failure of such structures are seen in the works of the Furukawa Electric Wire Works, the Nippon and the Tokyo Electric Companies, the Mitsukoshi Warehouse, and the unfinished Nagai Office building. The collapse in each instance was complete, burying many operatives under the ruins. It is difficult at this time to make any accurate statement as to the exact causes of these failures of buildings supposed to be earthquake proof, but at first sight the impression is gained that perhaps a weak concrete mixture coupled with inadequate steel reinforcement and general skimping of materials on the part of contractors lies at the bottom of their collapse. The Nagai office building facing the imperial palace on Babasakimon, would seem to indicate insufficient cement in the concrete mixture, as everything above the second floor crashed inwards, carrying concrete pillars, floor beams and floors with it, burying at least two score of workmen under a mass of *débris* two floors deep. The illustrations of these structures will help to convey some idea of how this class of structure stood the test. On the other hand, there were other large purely reinforced concrete buildings which admirably stood the quake to be later cleaned inside and out by the fire, leaving only the concrete shell.

To the layman, the first impression, one that has always been in our mind, is that the three to four story steel frame structure is the ideal type for an earthquake country like Japan, and the examples of such buildings which stood the test seems to confirm this impression. The Tokyo station came through without a crack. This is a heavy steel frame structure of three stories with a great floor area, and faced with brick. It was built in 1913 some years before the more modern and higher type of steel frame buildings were planned. In the same way, the Mitsubishi head office buildings of three and four stories adjoining the greater Marunouchi office structure came through the test without one brick being loosened on its facings or damage inflicted in its interior. The new three-storied Mitsubishi Bank across the street came through unscathed. The Imperial Hotel, however, stands as a monument to its architect and builder and fully vindicates his judgment. Perhaps no building in the world has been subjected to such scathing criticisms as the Imperial Hotel, the opinion being freely expressed that it would come tumbling down at the first real shake. Aside, however, from a very minor crack at one of the expansion joints, it suffered absolutely no injury and stands as the one safe harbor of refuge for the foreigners in a devastated city. With the exception of its central structure housing the grill room, theatre, and ball room, about five stories in height, the edifice throughout is of three rather low stories. The building superintendent (a Mr. Muller) improved on the original plans by insisting on about four times the amount of steel in the framing, and personally inspected every batch of concrete at the time it was mixed. The building is also on a floating concrete foundation and when the great shake came, it simply moved in harmony with a gentle smooth and even swing without shocks and jars. At any rate, the Imperial Hotel stands, in company with such buildings as the Tokyo central station and the Mitsubishi head offices, is a type that will undoubtedly appeal to the authorities as the standard for future construction.

The common opinion seems to be that the so-called sky-scraper of several stories has failed to stand the test, and although engineers may point with pride to the various good features of such structures, the people who have to work in them will have the last say. For the present at least, or until the people have forgotten their experiences, it will be difficult to induce men to accept positions in offices in these structures.

The extent of the damage to buildings in Tokyo may be gauged from the following list :—

Kojimachi Ward

The Finance Department, Home Department, Government Printing Bureau, French Embassy, Board of Audit, Police Training School, Monopoly Bureau, Patent Bureau, Kojimachi and Hibiya Police Stations, Imperial Theatre, Metropolitan Police, Hibiya Grand Shrine, Central Post Office, Tokyo Electric Light Co., Central Telephone Bureau, Yurakuza Theatre, Yurakucho and Iidamachi Railway Stations, Kokugakuin College, Japan College of Dentistry, Kojimachi and Toranomon Girls' High Schools and Count Ii's residence.

Kanda Ward

The Matsuya Department Store, Tokyo Gas Company, Commercial University, Chuwo Law College, Meiji University, Nihon University, Senshu University, Girls' Profession School, Tokyo College of Dentistry, all primary schools in the ward, and Kanasugi, Hamada and Inouye Hospitals, Nyudokan Variety Hall, five cinema halls, Manseibashi Station, Nishiki-cho Police Station, Meiji Kaikan Hall and Y.M.C.A. Hall.

Nihonbashi Ward

The Bank of Japan Murai, Morimura, Tokai, Yasuda, Kawasaki, Daiichi, Daisan and Dai Hyaku Banks; Tokyo Stock Exchange and Tokyo Rice Exchange, Mitsukoshi and Shirokiya Department Stores, and Meijiza Theatre, Nihonbashi Club, Chugai Shogyo

Shimbun, 11 primary schools, Central Telegraph Bureau, and Hisamatsu, Horidome and Shimbabashi Police Stations, and Yanokura Hospital.

Kyobashi Ward

The Hoshi Pharmacy, Chiyoda and First Mutual Life Insurance Companies, Takashimaya Drygoods Store, Jugo Bank, Hattori Watch Store, Asahi Shimbun, Jiji Shimbun, Kokumin Shimbun, Yorozu Choho, Yomiuri, Chuwo Newspaper Offices, Seiyoken Hotel, Kabuki Theatre, Department of Agriculture and Commerce, Shintomi Theatre, Communication Department, Tsukiji Naval Arsenal, and 16 hospitals.

Shiba Ward

Shimbashi Station, Jikei-in Medical College, Railway Hospital and 18 hospitals, seven shrines, 48 temples, and Hamamatsu-cho Works of the Tokyo Municipal Electrical Bureau.

Akasaka Ward

The American Embassy, Baron Okura's residence, Okura Fine Arts Gallery, and Yotsuya and Shinjiku tram cars sheds and two cinema halls.

Koishikawa Ward

The Military Arsenal.

Hongo Ward

A portion of the Tokyo Imperial University, High Normal School for Women, residences of Dr. Okano, Count Raiju Matsudaira and of Count Uyesugi, Hongoza Theatre and four temples.

Shitaya Ward

The Iwakura Railway School, Uyeno Girls' High School and 11 other schools, Ichimura Theatre, Hino Hospital, three cinema halls, Uyeno Station, Shitaya Ward Office, Uyeno and Sakamoto Stations.

Asakusa Ward

The Higher Technical School, 11 primary schools, 8 hospitals, 12 shrines, 4 temples, 4 police stations, Hanayashiki Garden, 37 theatres including cinema halls, and the entire quarter of Yoshiwara.

Honjo Ward

The entire area including :

Three police stations, Military Provisions Department, the villa of Mr. Yasuda, Ekoin Temple, and 1 middle school.

Fukagawa Ward

The entire area including :

Three police stations, the villa of Baron Iwasaki, Mercantile Marine School, Marine Products School and 10 other schools, Asano Cement Works and 12 large factories and all buildings of Susaki gay quarters.

In Yokohama, the following official figures of destroyed buildings are given out by the authorities :—

Houses before the calamity	93,840
Burnt houses	55,826
Collapsed houses	18,149
Saved houses	19,865

Detailed information on the population of Yokohama is as follows :

Population before the calamity	441,048
Foreign residents	7,492
Population who lost home in the fire	226,070
Population whose houses collapsed	87,118
Population in the saved houses	95,352

Nearly all the government offices are to be housed in temporary wooden buildings with galvanized iron roofs, pending the completion of plans and the appropriation of funds for permanent structures.

The new buildings will be concentrated at Otemachi, covering a gross area of 65,000 *tsubo*, at a total outlay of ten million yen. The offices will each measure 48 feet in the front, and be intercommunicable by means of verandas. The government intends to adopt soon two important measures for the benefit of Tokyo public, one of them being assistance in the reconstruction of hospitals and the other the re-inforcement of police forces in Tokyo.

More than 100 leading hospitals were destroyed in the recent flames together with large stocks of medical stuffs, tools and implements.

For the next few years Tokyo and Yokohama, in fact, all the towns in the devastated area will revert to primitive barrack communities hastily constructed of wood and galvanized iron, calling for immense quantities of timber and roofing.

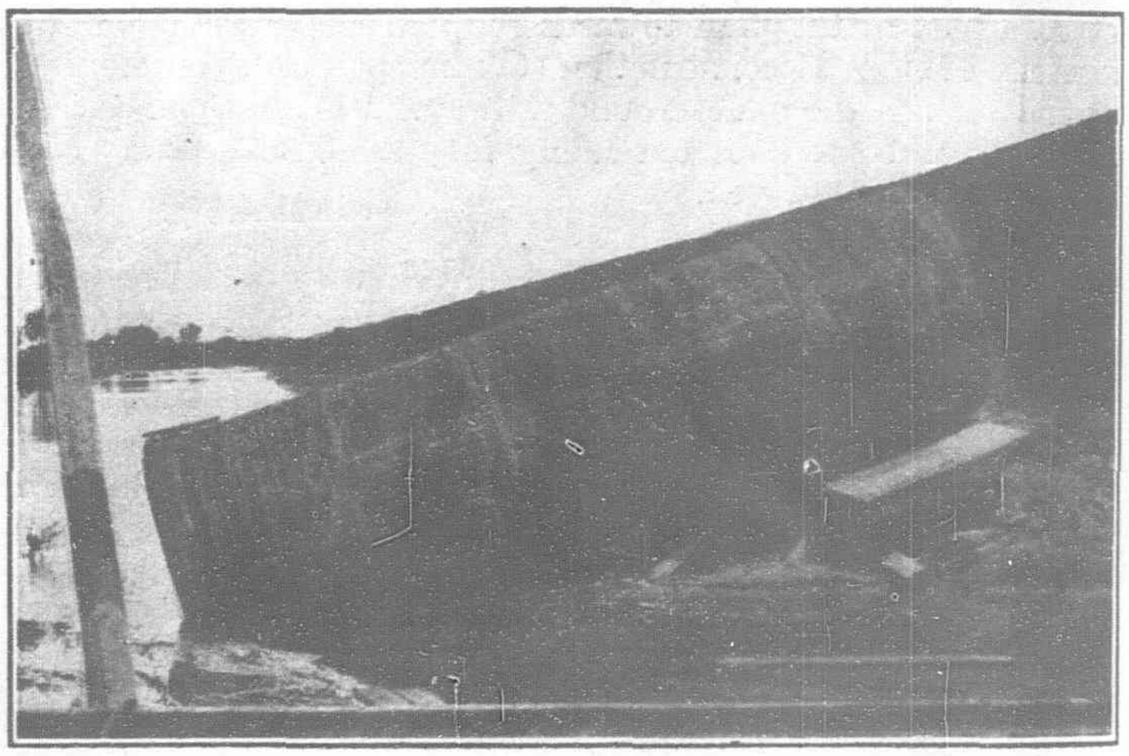
Barrack villages and towns, each housing from 3,000 to 10,000 refugees, are appearing in various parts of Tokyo and Yokohama. In Tokyo alone, there are enough barrack sheds for 150,000 persons already, and more are being put up, it is said.

According to the present plans of the Tokyo municipal officials, in most of these barrack villages or towns, the refugees are to be asked to organize public health, fire, and night patrols and to exercise self-government as far as possible.

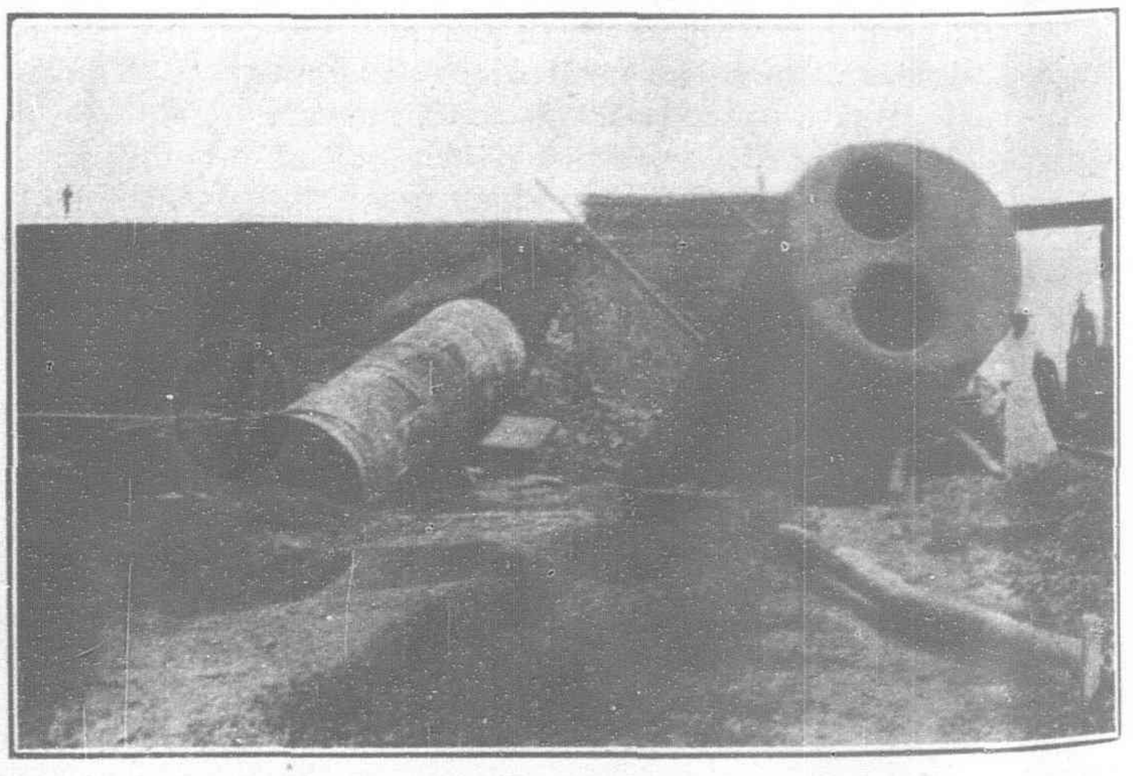
Schools, nurseries, and public bath houses are also planned for these communities. Some of the larger barrack communities are located in Shiba Detached Palace premises, Shiba Park, Hibiya, Ueno, Kudan, and the Meiji Shrine premises.

The Force of the Wind

DURING the big typhoon, which occurred early in August of this year, several freak incidents took place. In the northern port of Chinwangtao a great deal of damage was done to both life and property. Five inches of rain was recorded in less than twelve hours, flooding the city and surrounding country, including the Liu Chang Coal Mines some thirteen miles north of the port.



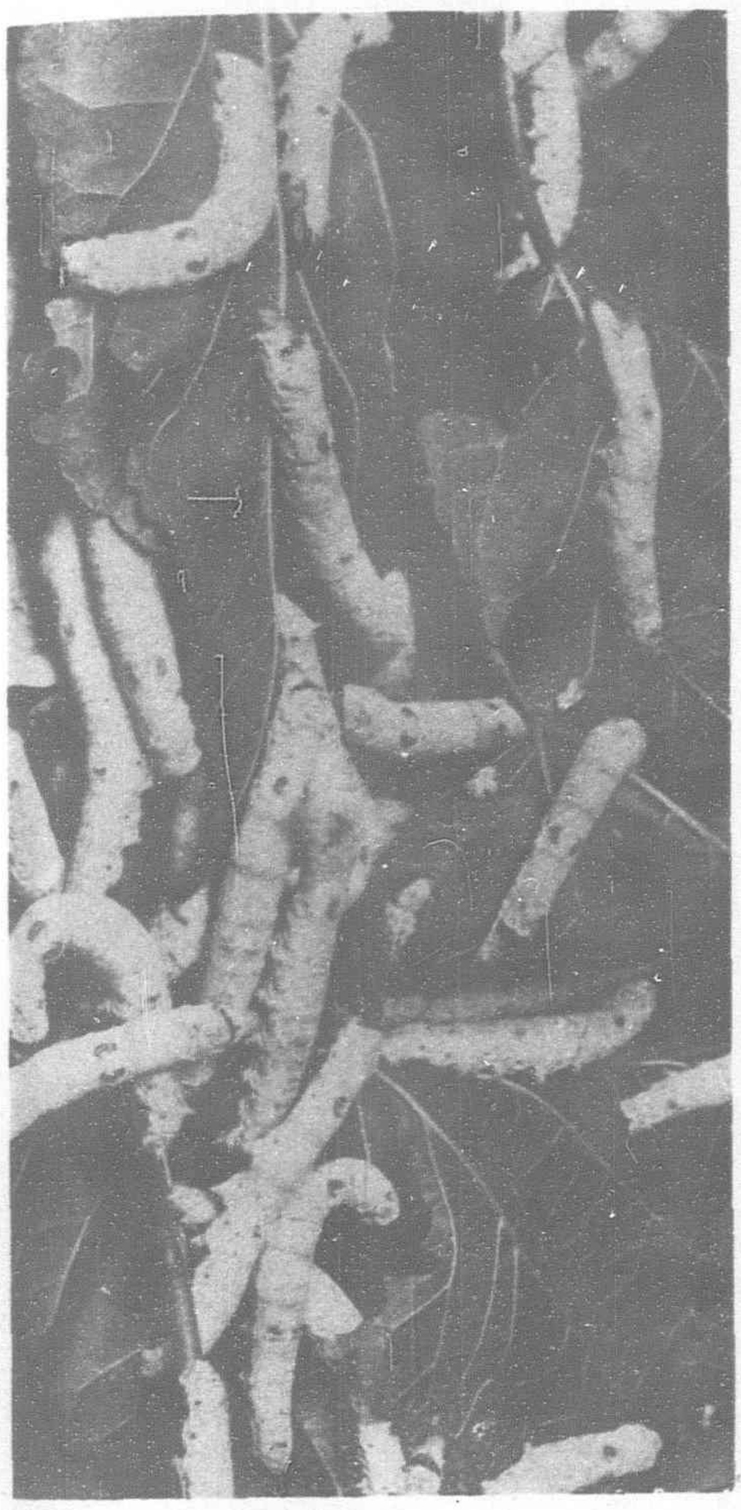
These same mines had just received a shipment of two Lancashire type boilers from Davy Brothers, Ltd. of Sheffield, purchased through their Shanghai agents, The Representation for British Manufacturers, Ltd. The boilers, just landed at Chinwangtao, had been loaded onto flat cars and run on a siding to await an



engine to be hauled to the mines. They never got any further, that is to say along the railway, for the fury of the elements caused the road bed to be washed out and the gale, running 150 miles an hour, lifted the boilers, cars and trucks off of the track and deposited them in a near-by rice-field.

Japanese Silk Production

By J. S. M. Ward



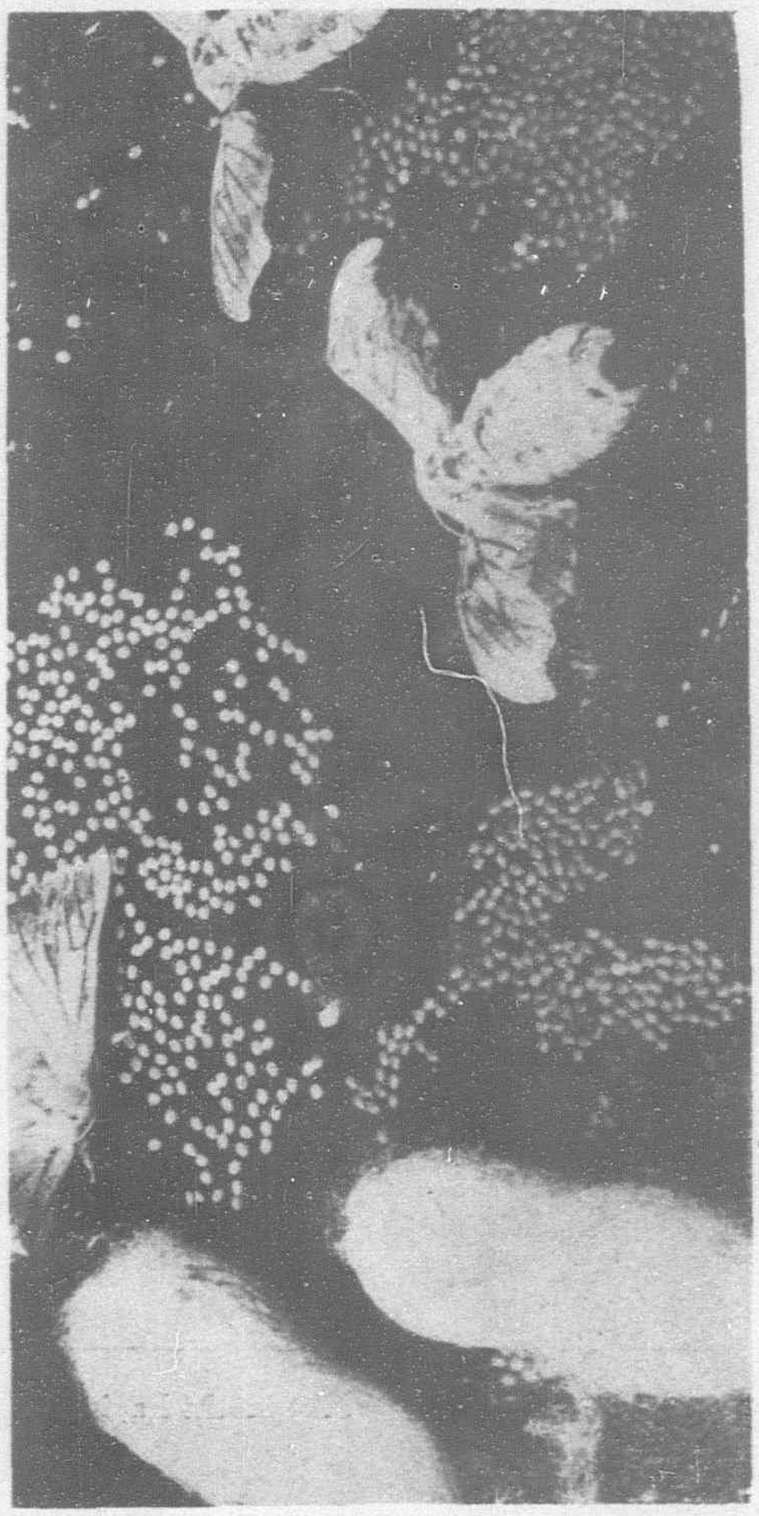
Silk Worms Feeding

THE general method of sericulture is the same throughout the world. The food of the silkworm is of course the mulberry, but in the East special types of mulberry have been cultivated for generations, as the success of silkworm raising is largely dependent on the food supplied. The soil in which the mulberry grows, and the age and condition of the tree, are important factors. It is found in practice that as a rule an elevated position with a dry and well-drained soil produces the best quality leaves.

The eggs are usually hatched by artificial heat just when the mulberry leaves are ready for the feeding of the larvæ. These eggs are very small, about 100 of them weighing a grain, and a large number of worms may at first be kept in a small space, but they grow rapidly and must be transferred to fresh trays every few days. Pieces of paper with small holes punched in them are placed over the trays where hatching is proceeding, and as soon as the worms burst their shell they creep through these openings towards the light, and thereby scrape off any fragments of shell which adhere to their skin. These fragments if not thus removed would kill them by constriction. The rearing-houses in which they are kept must be well lighted, ventilated, and clean, and so far as possible the temperature must be controlled. A variation in temperature of from 68 degrees to 78 degrees F. does not injure the worms, but a higher temperature is very destructive. On the other hand a lower temperature retards their growth and development, but their health and vigor are increased and the cocoons they spin are much bigger in proportion. The worms increase in size with great rapidity, and their appetite is enormous. They cast their skins three or four times after hatching, and when the moulting period approaches they gradually cease eating, and at such periods they have to be left undisturbed and in quiet.

When they are mature and ready to undergo their transformation into the pupa condition they eat no food and begin to crawl up the brushwood branches provided for them, and spin their cocoons. It is at this time that they need much attention. If they crowd together two worms may spin together and so interlace their threads. From these double cocoons only a coarse and inferior thread can be obtained. The insects take three or four days to complete their cocoons, which, after an interval of two or three days, are collected, the pupa being killed in order to prevent them developing further and bursting their shells. Those cocoons which are selected for the purpose of producing fresh eggs are freed from external floss and preserved at a temperature of from 66 degrees to 72 degrees F., and after a lapse of about 11 to 15 days the moths begin to appear.

The spinning of the silk from the cocoons is done by somewhat primitive methods in Japan. The first step is to separate all cocoons stained by the premature death of the chrysalides, pierced cocoons, and any other imperfect ones. These are put aside for spun-silk manufacture. The uninjured cocoons are sorted into classes according to color, size, and quality of fibre. On the successful carrying out of this process depend the uniformity of quality, and evenness and regularity of the fibre. The natural gum of the cocoons is then softened. The ends of the filaments must be caught and laid together during the process of unwinding, so as to form a single uniform rounded strand of silk. As the reeling proceeds the reeler has to watch the thickness of the strand, and introduce new cocoons to replace those from which all the reelable thread has been removed. In this manner a uniform fibre of indefinite length is produced.



Silk Moths, Eggs and Cocoons

The Human Factor

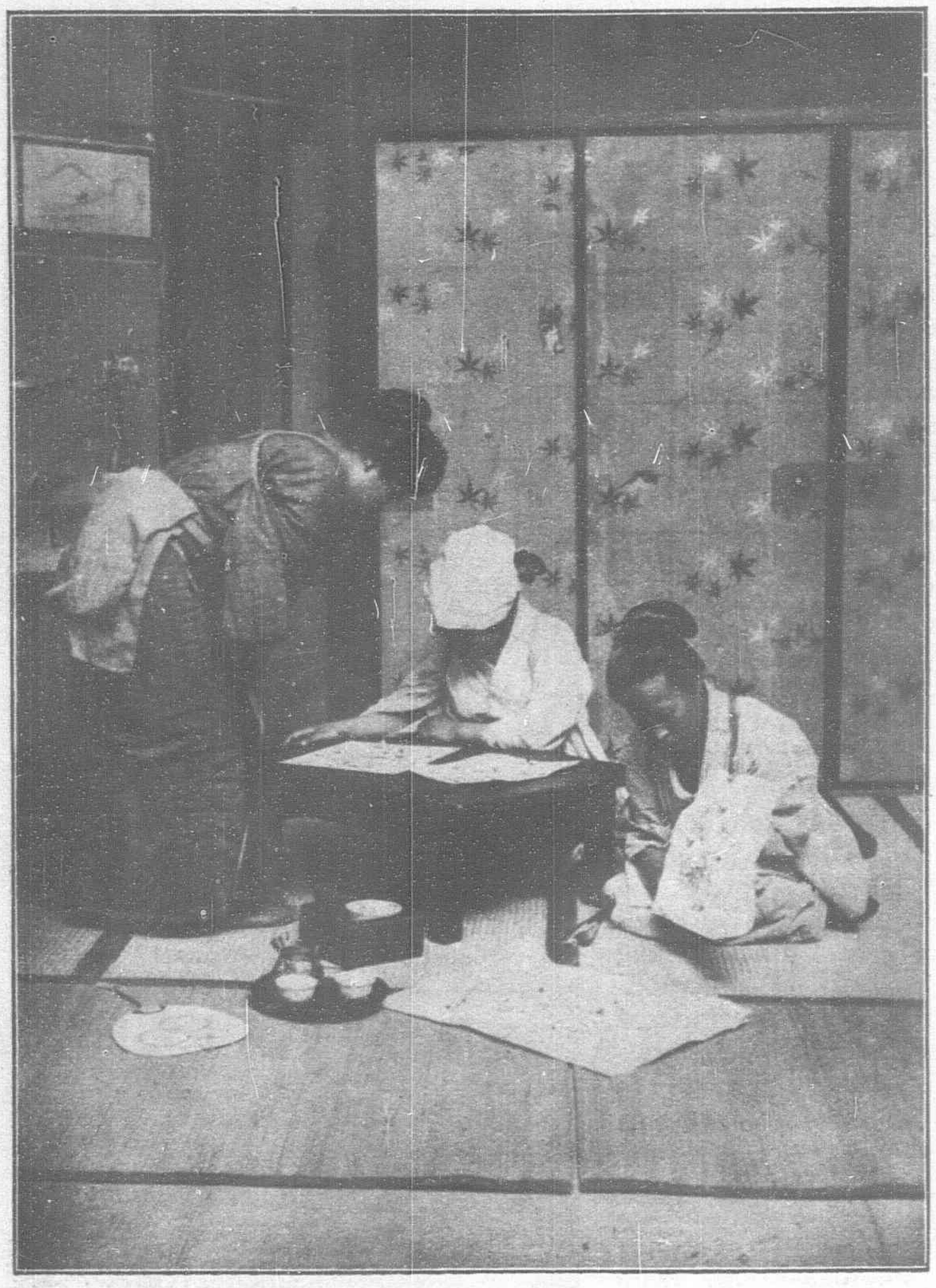
The skill of the Japanese, whose trained eye and delicate touch produce a raw silk of remarkable smoothness, more than counterbalances the somewhat primitive character of the machines they use.

The manufacture of silk has been a leading industry in Japan for many years; indeed, it is difficult to find a time in Japanese history when silk was not produced and manufactured in Nippon. The industry probably was introduced from China, like most of the arts and crafts of Japan.

Naturally, in those early days, it was made on hand looms, and even to-day hand looms are far more numerous than machine looms. In 1908, out of a total of 783,155 looms, 745,525 were hand looms and only 37,630 were machine looms. Since then the tendency has naturally been to increase the number of machine looms, but the number of hand looms has not substantially decreased, although it has fluctuated. In 1917, out of a total of 849,836 looms there were still 671,263 hand looms, which is only a very small decrease. On the other hand, the number of machine looms had increased nearly fivefold, and the total in that year was 178,573. In 1908 the total output of woven silk goods of pure silk according to official Japanese statistics was worth £9,955,-552 (99,555,518 yen), whereas in 1917 the value was £21,972,290 (219,722,896 yen). The production of mixed silk and cotton goods had risen in value from £2,468,991 (24,689,907 yen) in 1908 to £4,-598,228 (45,982,274 yen) in 1917. The industry is largely operated by female labor, more than eight-ninths of the employees being women. This is due to the fact that in a large measure it is still a home industry, and the women work the hand looms in their own homes.

Supply of Raw Material

Sericulture is also a very old industry in Japan, and is still in a flourishing condition. Both in quantities and value pro-



Silk Moths Laying Eggs

Silk Worms Just Coming out from Thin Eggs

duction has greatly increased. Whereas in 1908 the value of raw silk produced was £14,866,267 (148,662,670 yen), in 1916 it was £32,255,166 (322,551,660 yen). The export trade has also grown very rapidly. In 1908 32 per cent. of the output was consumed at home and 68 per cent. was exported, in 1920 23 per cent. was consumed at home and 77 per cent. was exported; or, in other words, raw and waste silk to the value of some £26,700,000 (267-000,000 yen) was exported. At the same time the amount of wild silk imported rose nearly fivefold, the total in 1918 being no less than £750,000 (7,500,000 yen) worth, but it should be mentioned that this was an unusually large importation, the previous year's imports being worth only £250,000.

Cocoons are also imported in large quantities, the value of the 1918 imports being over £300,000 (3,000,000 yen), but that was a phenomenal year, when silk rose in value throughout the world; the previous year's imports were worth only about £133,334 (1⅓ million yen).

It should be noted that silk is still largely used in the bulk of the people's clothing, although it is slowly giving way to cotton and cheaper goods among the working classes, and with the increased use of European costume it is no longer a *sine qua non* for festivals, as it was a few years ago.

From the point of view of the outside world, the side of the silk industry of greatest interest is the export trade, which has certainly shown a most remarkable development in recent years. In considering the export figures it must be remembered that the value of everything has increased at least twofold, and more in many cases.

Feeding Silk Worms

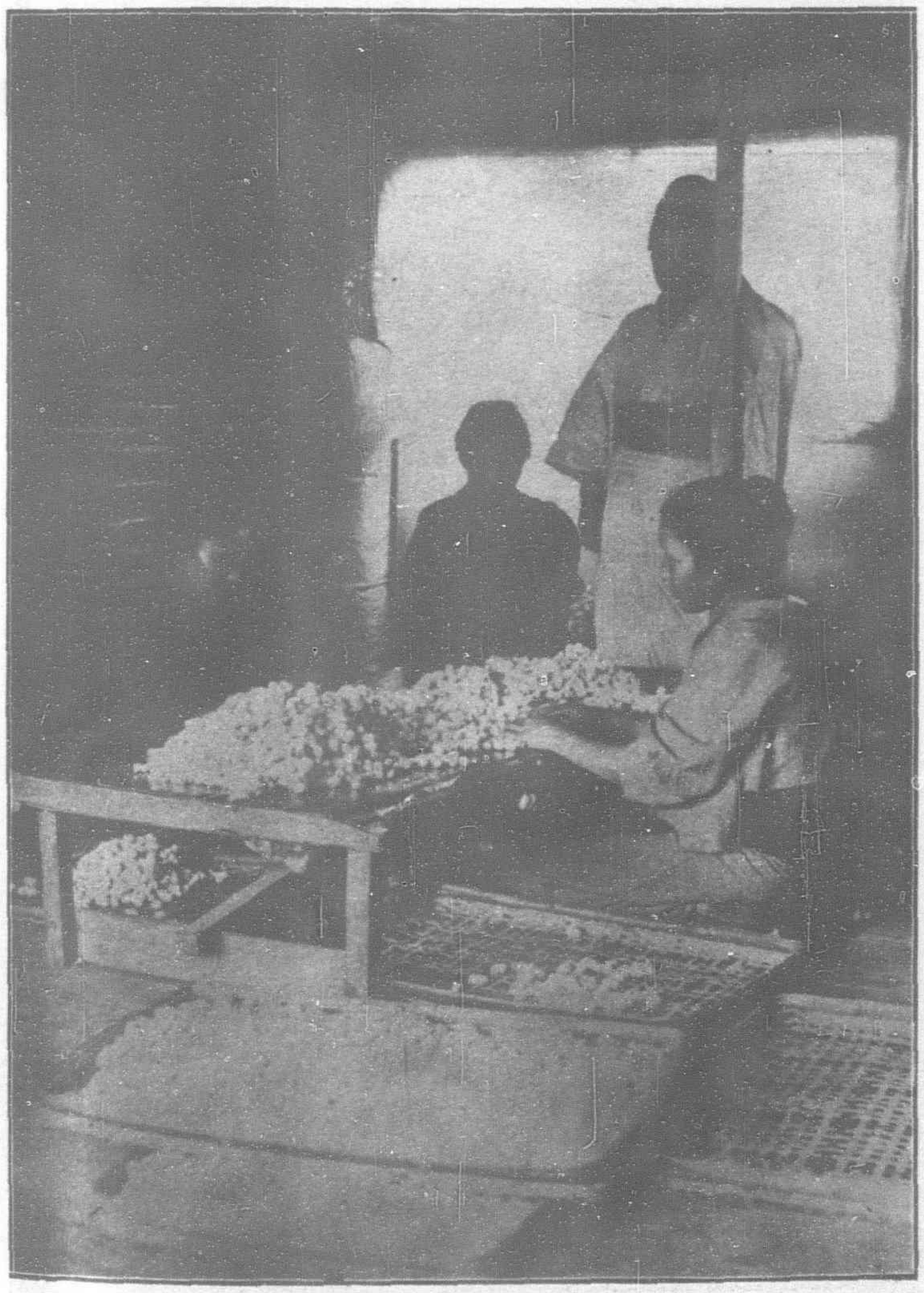
The export of silk (Noshi and Kibiso) in 1912 amounted in value to £1,500,000 (10,500,000 yen), and in 1918 to over £2,700,000 (27.000,000 yen). The two countries which took the bulk of these goods were France and the United States—France importing nearly £1,-300,000 (13,000,000 yen) worth, and the United States £1,150,-000 (11,500,000 yen) worth. Raw silk exports rose in value from £15,030,000 (150,300,000 yen) in 1912 to £27,030,000 (270,300,000 yen) in 1918. By far the largest buyer was the United States, which in 1918 purchased £33,867,000 (338,-670,000 yen) worth, France coming second with £4,160,080 (41,600,800 yen) worth, and the United Kingdom third with £729,400 (7,294,000 yen) worth. Sales of silk tissues (*habutae*) to foreign countries increased tremendously. Whereas in 1912 their total value was only £2,230,000 (22,300,000 yen), in 1918 it was over £7,000,000 (70,000,000 yen), Great Britain being by far the biggest individual purchaser. In 1918 she took over £2,200,000 (22,000,000 yen) worth, the United States coming second with £1,670,000 (16,700,000 yen) worth.

Brushing Eggs off the Paper

Handkerchief Trade

Of considerable importance is the development of the manufacture of silk handkerchiefs, which in 1912 were exported to the value of £470,000 (4,700,000 yen), a figure which rose in 1918 to £898,000 (8,980,000 yen). Here again the United States was the biggest purchaser with £300,000 (3,000,000 yen) worth, followed by Great Britain with £110,000 (1,100,000 yen) worth. But it must be borne in mind that the Japanese yen in 1918 was rapidly appreciating in value, and the sterling equivalent was greater at the time. On the whole, summarizing the position before the trade slump set in, it can be asserted that the silk industry in Japan had developed steadily in every direction. Some of the increase in output value was no doubt due to the actual intrinsic value of the goods, and does not necessarily imply a huge increase in exports; but it must still be remembered that the peak of the boom was not reached in 1918, but in 1919.

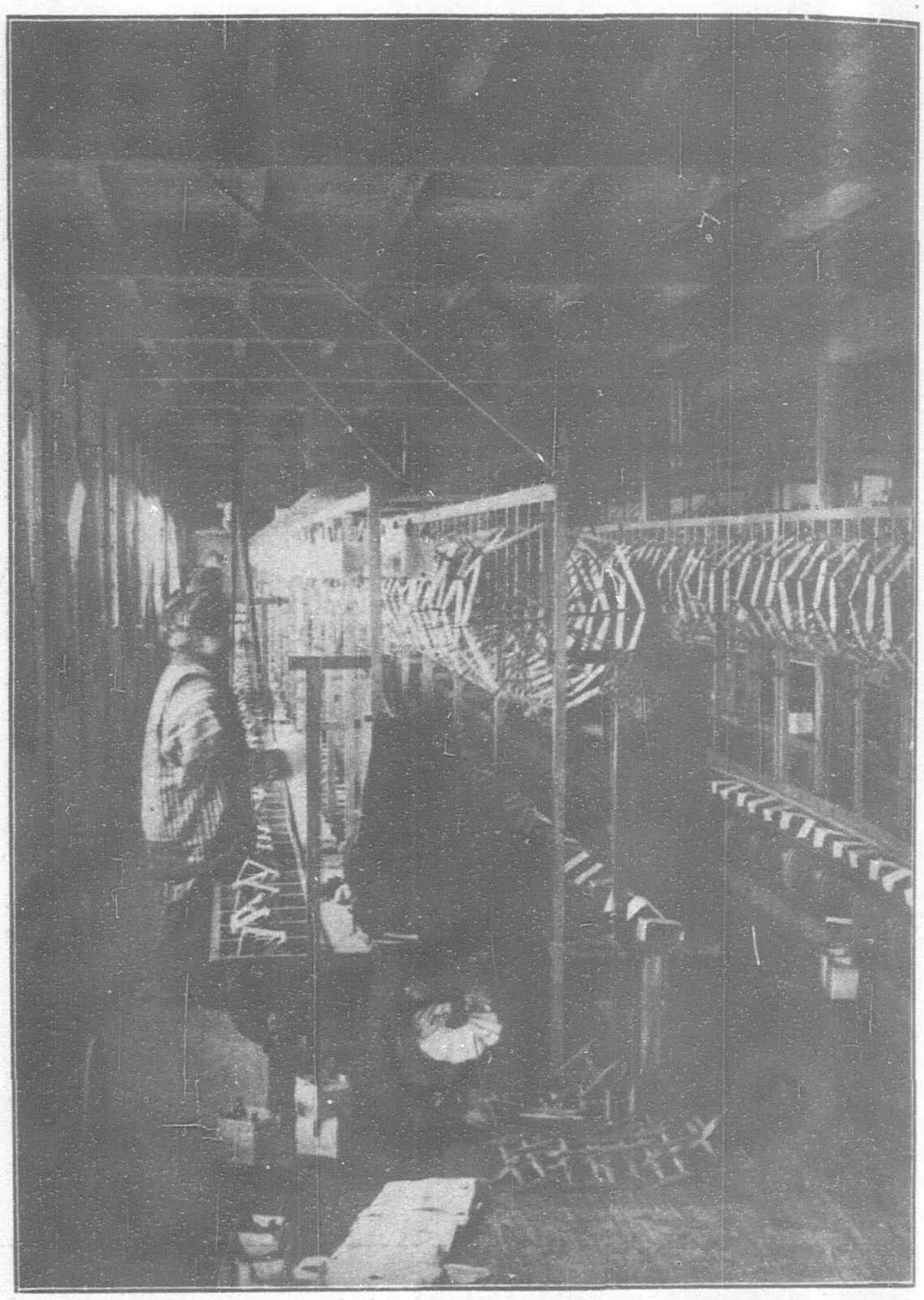
The year 1919 witnessed a period of unusual activity in the Japanese export trade in silk. It is true that the first half of the year was comparatively dull owing to the reaction that followed the prosperous times during the close of the war. This was particularly the case in special kinds of silk textiles, but after April in 1919 the demand for Japanese silk textile fabrics increased steadily in the United States, Canada, Australia, and India. On the other hand, exports to Europe decreased owing to the continuous depreciation in the exchange rates of those countries, which naturally affected Japan's trade with Europe, for the Japanese yen by this time was becoming one of the most appreciated moretary units



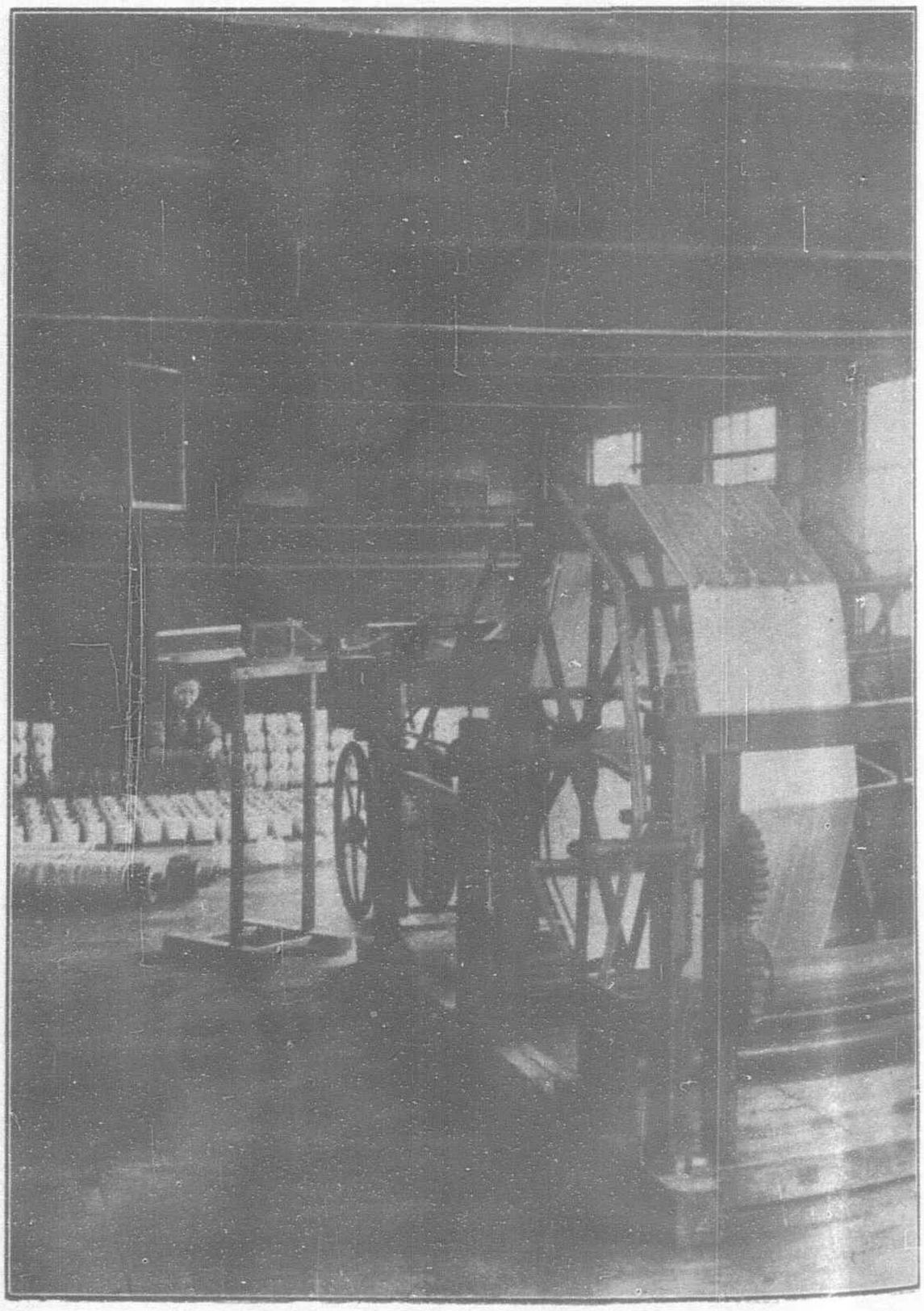
Picking out False Cocoons

A Silk Filature

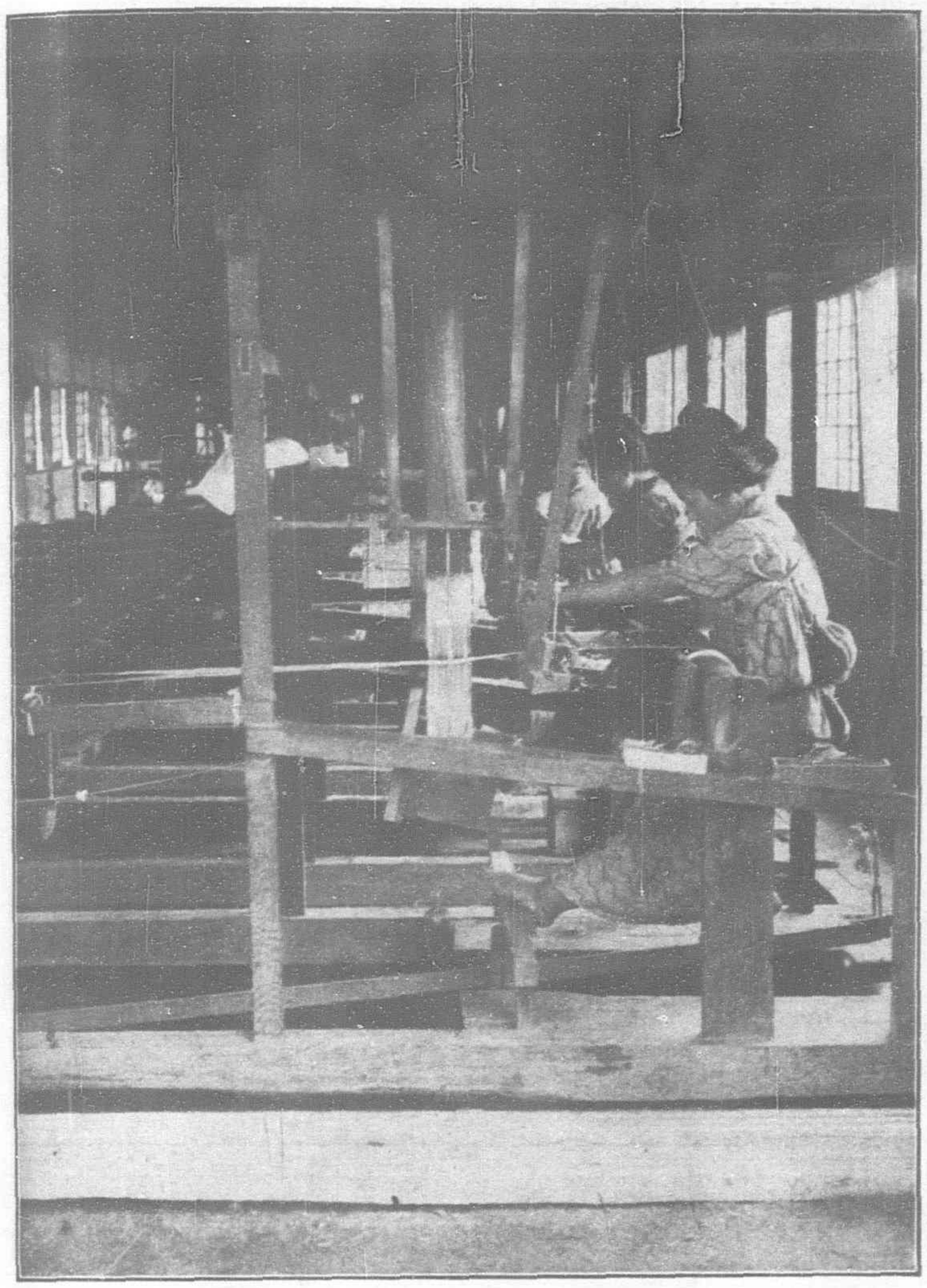
Winding Silk on a Tube by Means of a Spinning Machine



Preparing Silk for Weaving



Reeling Silk by Machine



Improved Loom for Silk Weaving

in the world. The huge increase of exports to North America, however, more than compensated for the loss incurred on account of the decrease in the exports to Europe, and this, coupled with a constant rise in the market price of silk yarns, added to the almost unprecedented figures in this class of Japanese exports. The staple industry, therefore, during 1919 attained a remarkable development, particularly in the Ishikawa and Fukui prefectures, which are important centres of the *habutae* industry. In the Fukui prefecture alone the production was between 40,000 and 65,000 rolls in each of the first four months of the year and increased to over 100,000 rolls in July and August. In Ishikawa output expanded from 50,000 rolls a month in February and March to about 85,000 rolls a month in September and October. It was during the late summer and early autumn of 1919 that the export trade in *habutae* reached its maximum, and this boom, coupled with a continued advance in prices, was reflected in the enormous trade returns.

Thus in the eleven months ended November 30 exports of *habutae* amounted in value to £7,586,847 (75,868,470 yen), and these figures represented shipments through the port of Yokohama only. During the same period the export of other silk manufactures amounted in value to £2,070,000 (20,700,000 yen) of "Chirimen" silk, £2,160,000 (21,600,000 yen) of other silk textile fabrics, and £600,000 (6,000,000 yen) of silk handkerchiefs, making a total of over £12,430,000 (124,300,000 yen). This figure was an increase of £2,365,000 (23,650,000 yen) over the similar figure for the same period of the previous year.

The opening weeks of 1920 still found the boom in progress, but very soon Japanese manufacturers in every industry began to experience difficulties with labor. Indeed, trouble had commenced in the previous year, but now was rendered more serious by the gradual development of the trade slump. In the main the silk industry does not seem to have suffered so severely as some of the other industries, notably the cotton industry, in Japan, but nevertheless it has been affected.

Made in the Home

A notable feature, as has already been pointed out, is the considerable amount of silk which is produced under the domestic system and the bulk of the silk goods consumed in the country is still made in homesteads. In the silk industry, particularly, silk reeling and weaving form subsidiary occupations for farmers and their families, but the statement that the cottage industries are carried on by the farmers' families requires some modification, because in many cases the families of the poorer classes in the towns also play their part.

The silk industry is pre-eminently one in which women and young girls are employed, and wages on the whole are comparatively low, even in factories organized on western lines. Thus, for example, in pre-war days in the dyeing and weaving trades silk filature women workers received an average of only 28 sen (6½d.) per day, and men 40 sen (9½d.) per day, these rates ranking among the lowest wages paid in the dyeing and weaving industries. After wages had risen in November, 1918, women workers in the silk filature only obtained an average wage of 57 sen (13½d.) per day, and in spinning 54 sen (13d.) per day was the amount paid as a rule; the wages for men were 64 sen (15¼d.) per day for filature, 82 sen (19½d.) per day for spinning, and 83 sen (20d.) per day for weaving, women weavers receiving as a rule 54 sen (13d.) per day or less.

In Tokyo men filature workers might obtain as much as 1 yen 70 sen (3s. 5d.) per day, whilst the lowest daily wage was 20 sen (5d.). Of course it must be understood that the higher wage is paid only for men of special ability, and, taken on the average, filature silk workers were paid lower than any other type of men workers.

Putting the situation briefly, it may therefore be said that in the silk industry wages are low, even for Japan, and this in part is due to the fact that the bulk of the silk industry is still carried on as a subsidiary industry, and is not the sole source of income of those employed in it.

Quality of Labor

Certain facts with regard to the labor situation in Japan strike the observer. First, labor is very plentiful, and in consequence labor-saving devices are conspicuous by their absence, and a large number of operations are done by hand which could undoubtedly be done more expeditiously and cheaply in the long run by machinery. One reason for this is that the high cost of installing machinery would involve a heavy initial expenditure, which means, of course, that the industry is held back by lack of capital, though to a certain extent the large profits made during the war have enabled Japanese industrialists to put more capital into their businesses than in the past. On the whole, it must be admitted that the efficiency of the labor is low, but undoubtedly in the last quarter of a century, there has been a distinct improvement in the quality of work, as well as in the amount of wages.

In considering the quality of Japanese labor, certain outstanding features are apparent at once. The average Japanese worker, though short, is strong and well-developed, and works very long hours at a stretch. This natural sturdiness he no doubt inherits from his peasant ancestors, but it has been noticed that the yearly records drawn from Osaka give a very low average of military "fit" men, which would indicate that industrial conditions in Japan tend to decrease the sturdiness of the population. Formerly in the mills there is no doubt that matters of hygiene were much neglected, but a great improvement is taking place at the present time.

The Japanese, on the whole, are skilful with their fingers, but their talent does not appear to help them much in factory work. They are undoubtedly docile as a rule, and will work long hours without complaining, but this is coupled with a lack of interest in the work almost amounting to apathy, which results in indifferent work. Although apathetic, the Japanese worker is, as a rule, a cheerful person, strange as this may seem, and can be quite contesnded and happy despite drudgery which would be almost in upportable to a European. The long hours of Japanese workmen are discounted by their inability to concentrate. They are very quick to learn, and workmen taught a particular task soon acquire a very fair degree of skill; but their employers complain that they require constant supervision or they become careless. As a result, the workmen get better results from simple rather than in-

tricate machinery, and their skill is seen best in their talent for reproduction down to the smallest details.

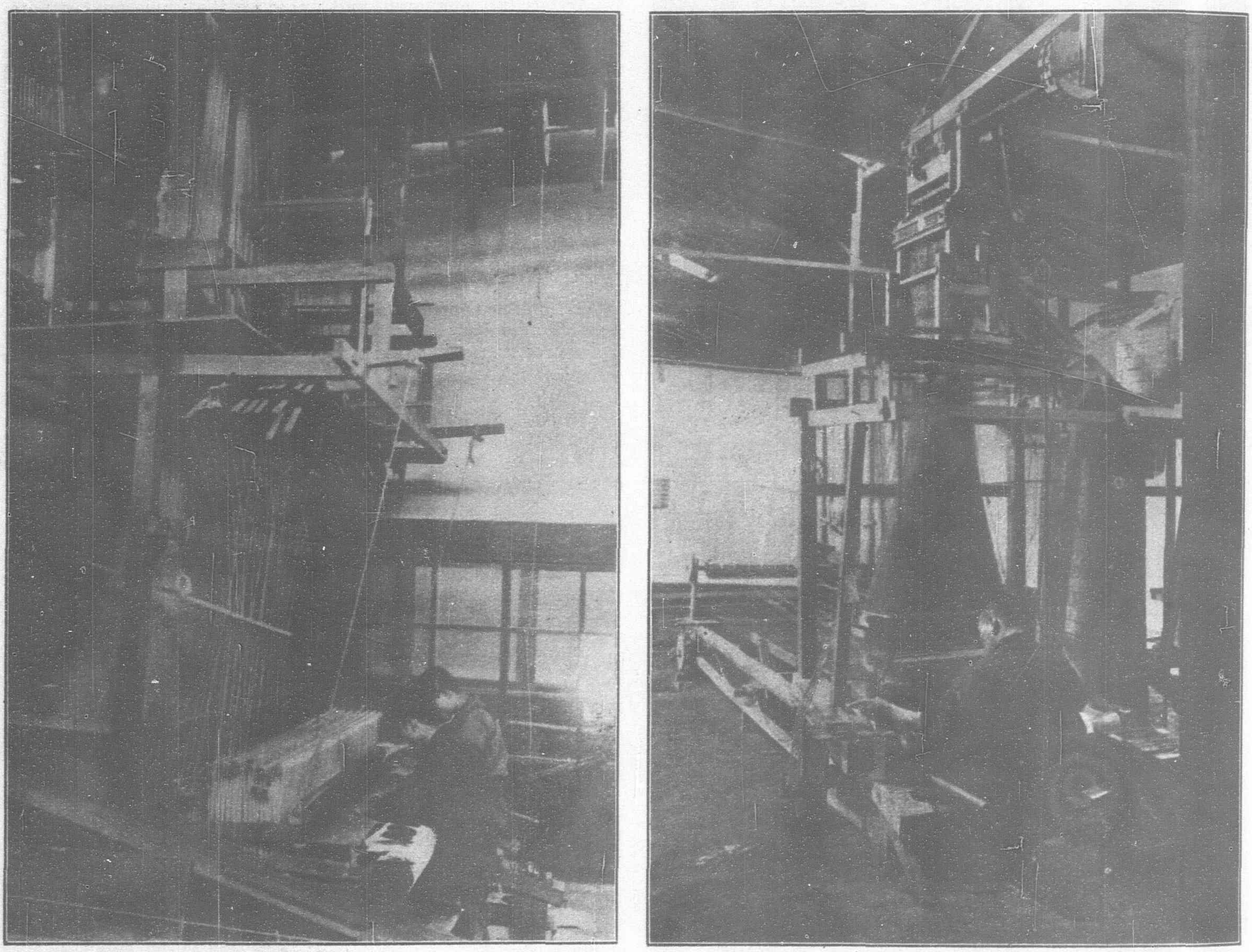
Improvement in Quality

Yet Japanese workmen are distinctly excitable, and storms arise very suddenly. Once the trouble is allayed it subsides as rapidly as it arose. Much has been written about the intelligence of the average workmen, and in many industries it must be recognized that it is not of the highest. Careful observation indicates that, under suitable conditions, the average workmen can develop very considerably, and this is shown in the steady improvement in the quality of Japanese goods. In particular, it has been found that the firms who have adopted more up-to-date methods and treat their workmen best undoubtedly gain considerably.

One feature which cannot be ignored is the extraordinary amount of carelessness noticeable in many Japanese workmen. Accidents caused by pure carelessness are exceedingly frequent, and although nine-tenths of this carelessness is probably due to ignorance, indifference seems to play a larger part than one would expect. The Japanese are, of course, more stoical than the average European ; their military training has inculcated in them the belief that their lives are of no great importance, and suffering is meant to be borne. This, while it makes them excellent soldiers, renders them, perhaps, less careful than the average western worker would be. Incidentally, the Japanese workman gives little thought to the careful treatment of his machinery.

Period of Transition

The industrial situation in Japan is at present passing through a period of transition. Forty years ago the factory system was unknown, but since then it has rapidly developed and, in particular during the last five years, great progress has been made. The consequences are naturally mixed. Some are good and many, unfortunately, are bad. Endowed with a plentiful supply of cheap labor, Japan has tended to devote her attention to the production of cheap goods. At the same time, as plentiful labor means low wages and low wages mean poor work, these goods were often of poor quality. Though the supply of labor is large, skilled labor in every industry is scarce ; but this factor is not so noticeable in the silk industry as in many others, due to the fact that there has been a persistent tradition of craftsmanship passed down through generations. Indeed, one of the reasons why the domestic production of silk



Silk Weaving Machines

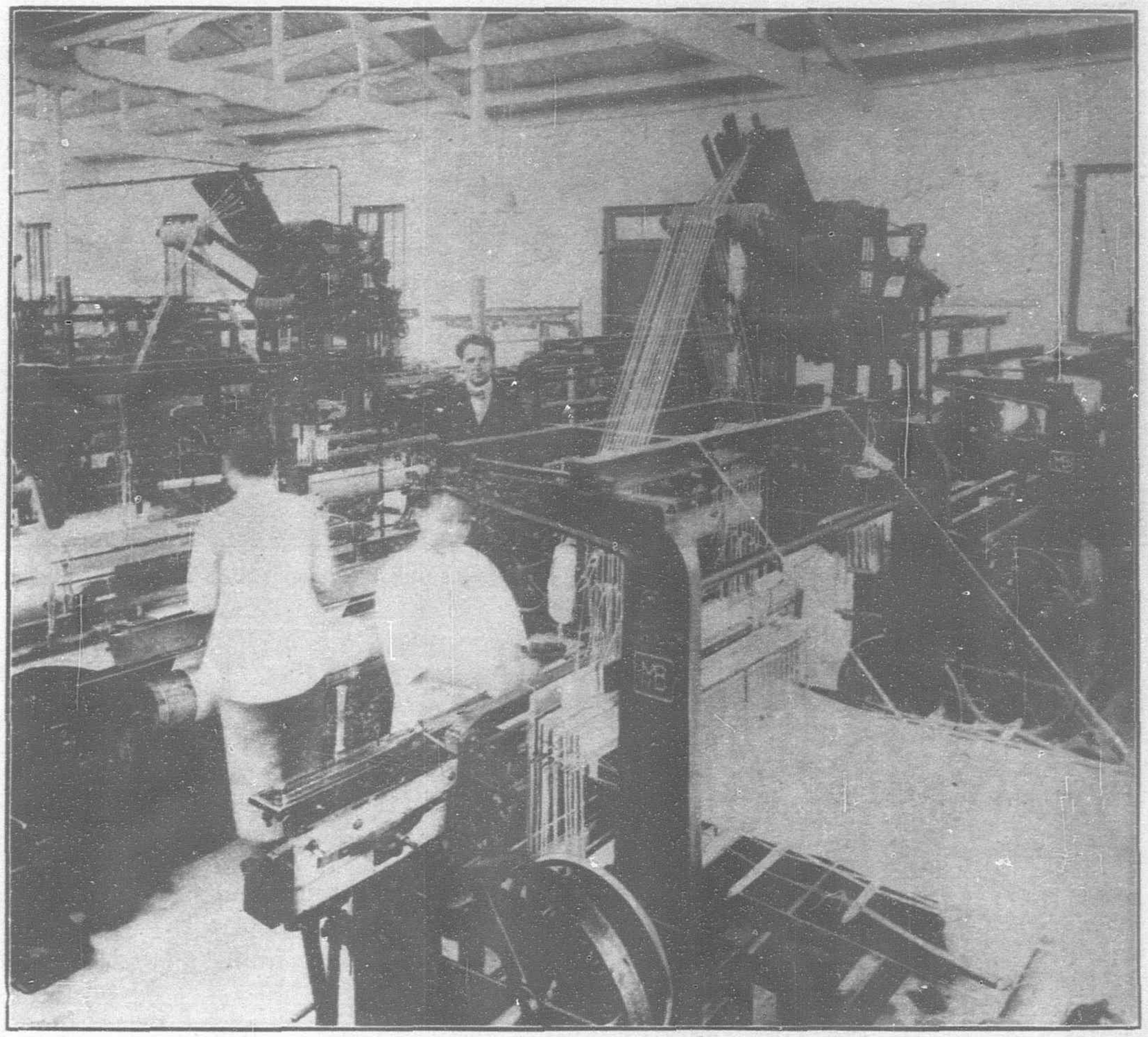
manufacture has been able to hold its own, in spite of increasing competition from machine-produced silk goods, is undoubtedly dut to the greater skill evinced by many of the producers. Recene tendencies point to a steady improvement even in factory-produced silk goods, no doubt due to the fact that the industry has now established itself on sound lines, and the proportion of skilled labor is steadily increasing. In factories the Japanese worker expects to work long hours, 10 to 12 on an average, with few holidays, and during the war most factories worked overtime. In the home industries long hours are also the rule, but they are more broken up, the industry being more in the nature of a second task, when farming or domestic duties are not employing the women.

Cost of Living

The standard of living in Japan is not high and the bulk of the employees depend almost entirely on rice seasoned with a little dried fish and some fresh or pickled vegetables. Fresh fish and meat are as a rule beyond their means. Often as they cannot afford rice alone, they perforce mix rice and millet or wheat and millet.

The steady rise in the cost of rice has hit the Japanese workmen very hard and between 1916 and 1919 the cost of the staple article increased fully threefold. It was due to this tremendous increase in the cost of living that Japanese employers were faced with a number of strikes in the year 1919-20 and with considerable social unrest. This resulted in large increases in wages, in many cases amounting to two or three times the pre-war rates, but even then it is doubtful if the workmen were as well off as before the war.

At the present time the trade slump naturally affects the silk industry, though apparently not to the same extent as the cotton industry. There is no doubt, taking it on the whole, that the silk industry is one of the most stable in Japan and is in a better position than almost any other industry to carry on an export trade. There is a very steady demand for Japanese silk goods throughout the whole world, not only in Europe, but more particularly in the states. In certain cases in the United States it has been found cheaper to buy silk shirts than flannel or even cotton ones. Most varied opinions have been expressed with regard to Japanese silk, but the true explanation appears to be that the quality varies enormously; while it is probable that the average is not so good from the point of view of strength as Chinese silk, it nevertheless meets with a ready sale. Some of the finest silk meshes produced are in great demand, particularly in the Middle East, Burma alone taking large quantities which are used for the most part as scarves by the Burmese women, and, of course, there is the steady demand for various Japanese silk products in the United Kingdom.

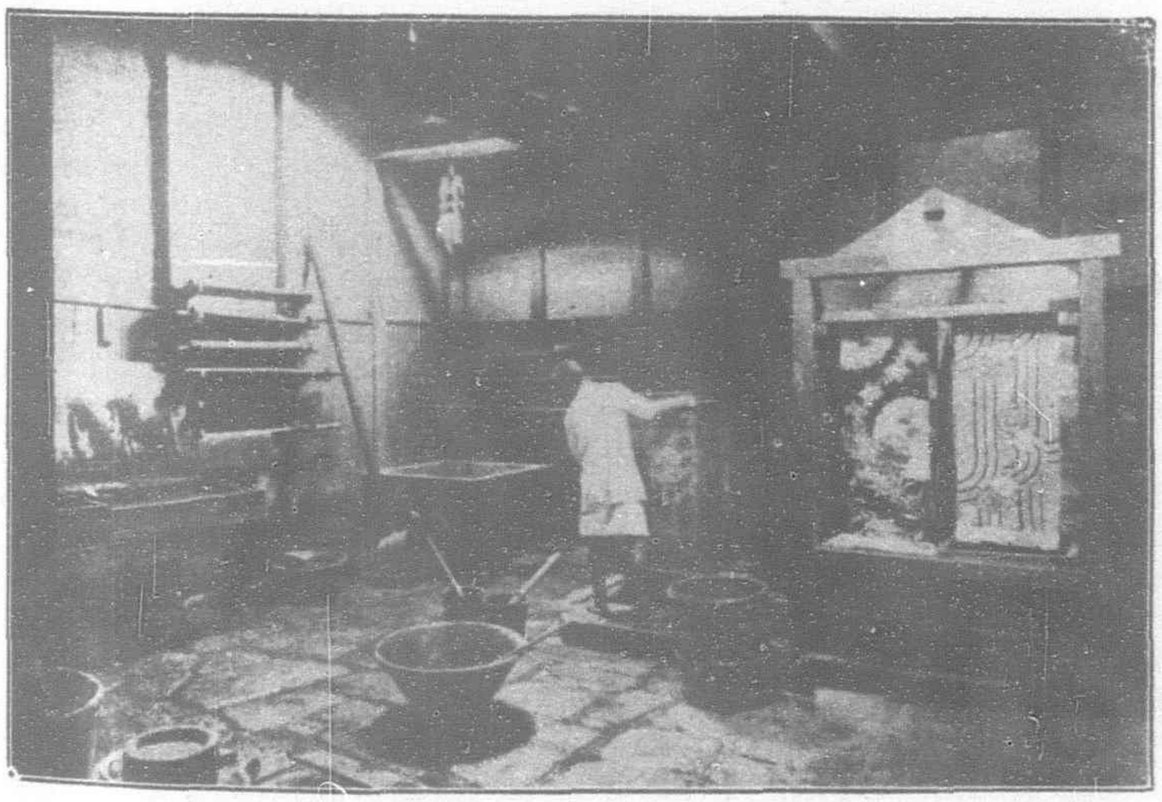


Modern Silk Weaving Machines are fast taking the place of hand labor

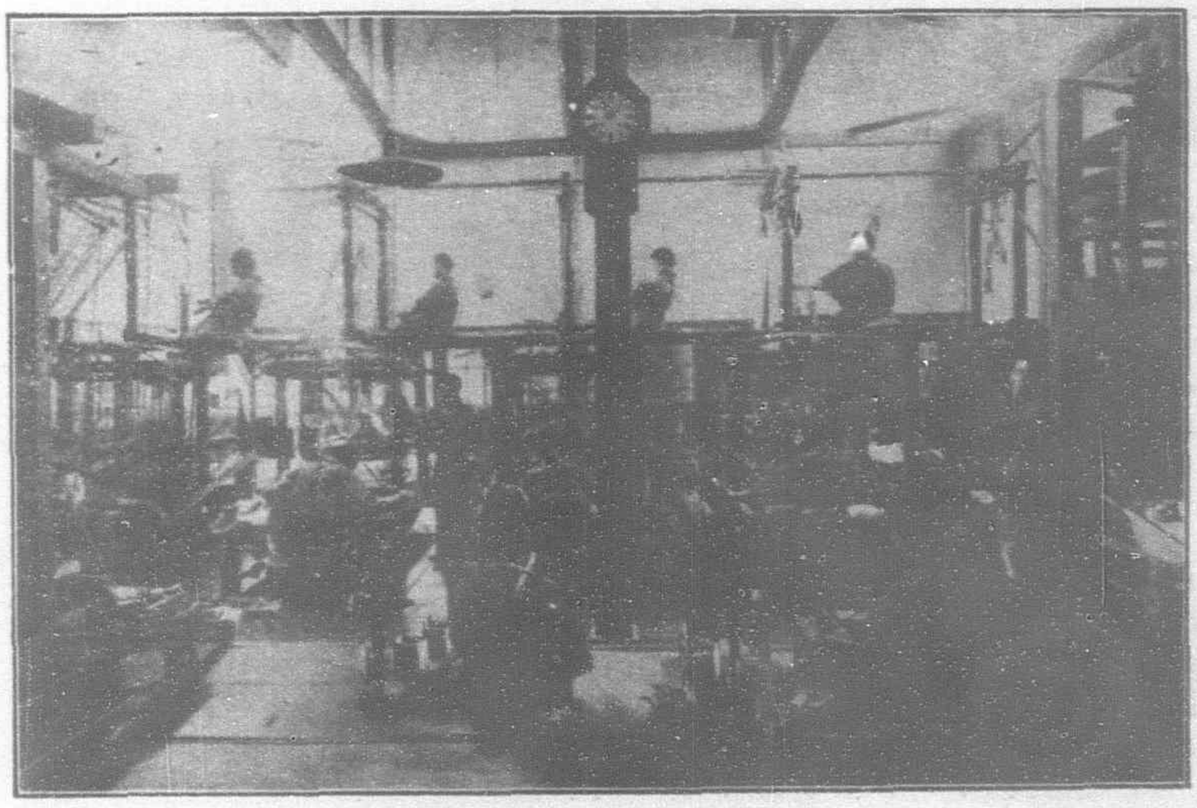
An Ancient Craft

A factor which must be borne in mind in considering the silk industry is, as has been pointed out, that for centuries it has been a native craft and there are long years of experience behind the workers. This differentiates it entirely from the wool or cotton industries, which are of modern growth and for the most part organized on factory lines. The skill and knowledge acquired by generations of silk producers and manufacturers cannot fail to benefit the modern Japanese silk factory. It is in a position to obtain comparatively cheap labor which is at least semi-skilled, therein being in a happier position than the cotton mills.

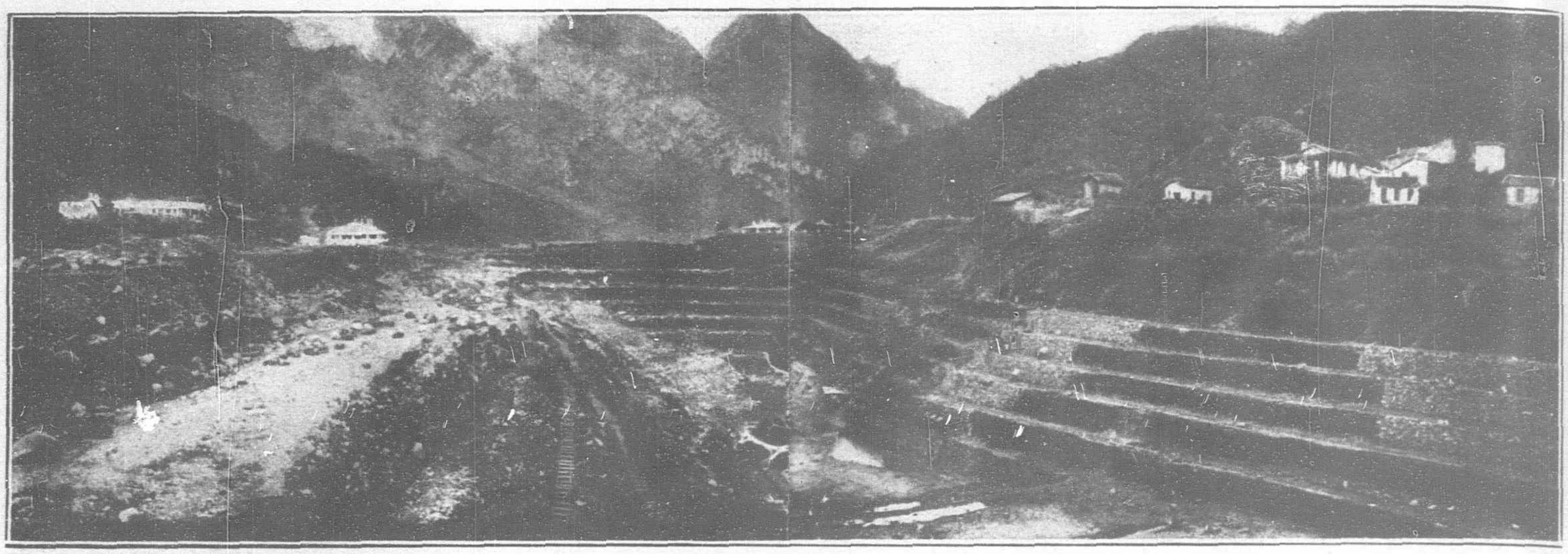
With regard to the future of the industry, it is difficult to prophesy, but there is little doubt that even during the slump Japan will continue to sell large quantities, for, everything considered, her prices are still comparatively low and the quality of her goods satisfactory. Further, as a supplier of large quantities of raw materials she is a most important factor in European silk manufacture. France alone taking large quantities of silk from her, despite her own home-produced supplies. British firms will watch with sympathetic interest the transformation of this age-old industry into a modern factory system, and it appears as if it was being effected in a satisfactory way. Yet it is probable that for many years the domestic side of the Japanese silk industry will continue to flourish and the peasants produce goods of higher quality than most of the factory-made materials.—*The Times.*



Dyeing Silk



Modern Silk Weaving Mill



Open Cut Tin Mines at Tinh-Tuc.

The Mines of Indo-China

Written by the Mines Department of the Indo-Chinese Government

(Continued from September issue, page 612)

III.—Mines of Tin and Tungsten.

GENERAL.

(*a*) SITUATION OF THE MINING AREA.—METHODS OF BRINGING THE ORE DOWN.

The tin and tungsten mines of Tonkin are to be found in the granite group of mountains of Pia-Wak about six miles to the west of Nguyen-Binh and 35 miles from Cao-Bang. From the delta to Na-Cham is 112 miles by rail, whence there are 95 miles of motor road to Nguyen-Binh via Cao-Bang, followed by 7 miles of mule-path to Tinh-Tuc and beyond. The ore is brought down by these means and the cost of this haul to Haïphong varies from 50 to 60 piastres per ton according to the mine.

(*b*) NATURE OF THE DEPOSITS.

The Pia-Wak group, the highest point of which attains 6,332-ft., consists of a thrust of granulite breaking through the old overlying schist, which is transformed near the points of contact into a very hard crystalline metamorphic rock, known as aphanite.

The thickest lodes, containing wolfram either in particles too small to be seen with the naked eye, or in lumps of about a pound, are to be found in the aphanite ; Cassiterite is generally found on the walls of the lodes. In the granulite the veins are small varying from 4 to 12-ins. in thickness, but sometimes in sufficient quantities as to constitute a "stockwerk."

The metal is also found in all kinds of alluvial soil from that lying on the flanks of the mountains down to the real alluvium of the valleys, where it is deposited in pockets.

The most important deposits are : lodes in the aphanite on the north and north-western slopes of the Pia-Wak Concession Saint-Alexandre) ; stockwerks in the granulite of the south and south-eastern slopes of the same mountain (concessions Robert and André) ; the alluvial soil in the valley of Tinh-Tuc at the foot of the northern slope and the moraines, actually exploited in the Beau-site and Ariane concessions.

(*c*) OLD CHINESE WORKINGS.

Prior to the French occupation the alluvium of the stanniferous Tonh-Tuc valley was actively exploited by the Chinese. The lodes of wolfram and cassiterite were also worked, but the Chinese did not know the value of the former and so left it and now modern miners are recovering it from the tailings of the old workings. In the old days the lodes were not much worked owing the hardness of the rock and to the difficulty of winning pure tin from the mixture of tin and wolfram found there. Even to-day with all modern perfections the metal obtained from the lodes contains but 98 to 98.5 per cent. of pure tin, whereas that from the alluvial pockets contains 99.5 per cent.

(*d*) RECENT EUROPEAN WORKINGS:—

The following table shows what has been done in 1921:—

It is well known that the wolfram mines enjoyed an exceptional prosperity during the war when this metal was in much demand and its price even touched for a moment in the United States ten times its pre-war value.

On the other hand no metal has been so hard hit in the after-war crisis as tungsten, for the output of the mines, four times its normal during the war, suddenly dropped to but a small amount as its price dropped considerably owing to the universal depression and the substitution of other metals for tungsten, as well to the discovery of large and easily worked deposits in the south of China. The price of wolfram in gold is now about half of what it was before the war.

For this reason the mines of the Pia-Wak are now confining their attention to tin, the price of which has also fallen, but not to so great an extent. The average price in 1921 comes out at £130 gold per British ton as against the pre-war averages varying between £133 gold in 1908 to £209 gold in 1912.

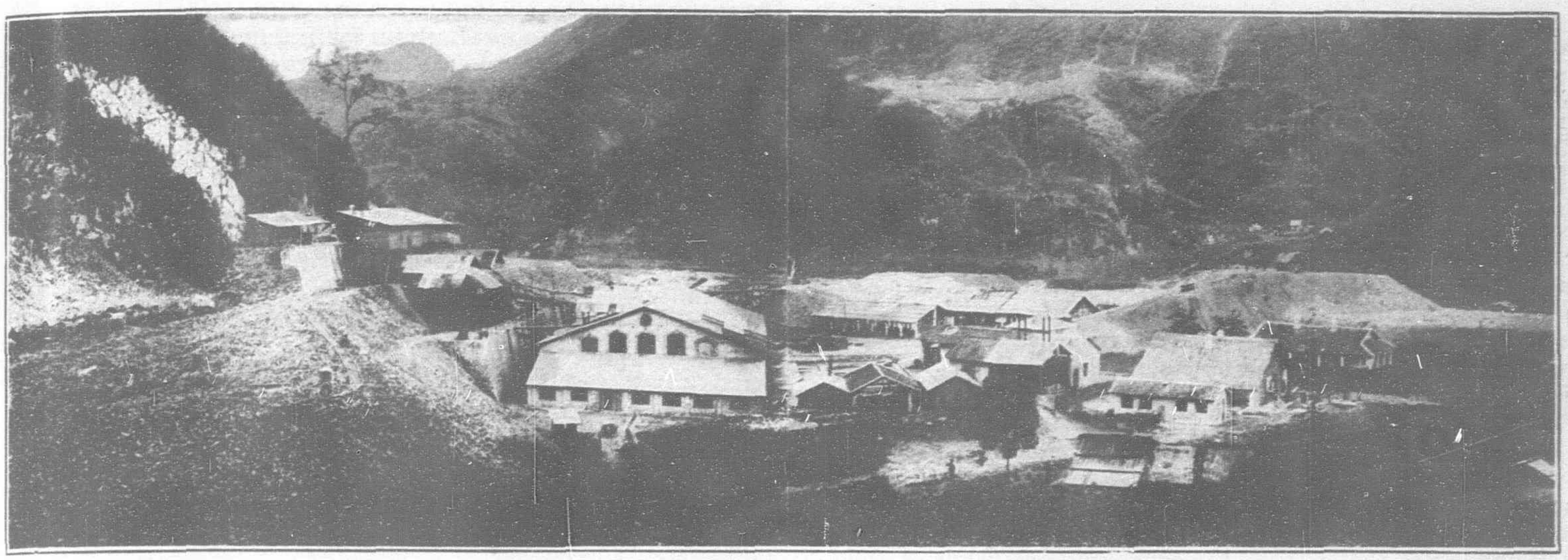
The chief workings are as follows :

SAINTE ADELE OR TINH-THUC MINE.

The Société des Etains et Wolfram du Tonkin, who up to 1919 had exploited lodes of wolfram in its Saint-Alexandre mine, restarted in November of the same year the working of the alluvium of the Tinh-Tuc valley, which had been suspended during the war. This alluvium is composed of blocks torn from the mountain side and embedded in a clayey and sandy mineral mass of cassiterite containing 4 to 5 per cent. of wolfram.

This soil extracted in open workings (15,700 cubic yards during March 1922) is passed through a washing plant, two-thirds of which is old-fashioned and cannot deal with more than 330 cubic yards per day, while the remaining third, being quite modern and only recently opened, can handle twice this amount. After being washed the ore is put through an electromagnetic separator and then is transported 17 miles—seven miles per pack-horse and ten miles per cart—to the furnaces at Ta-Sa which in 1921 produced 175 tonnes of metallic tin. Chinese furnaces have hitherto been utilized at these works, but a reverbatory furnace has just been installed.

The Company owns a 230-ft. waterfall at Ta-Sa producing at least 1,000 h.p. and has installed a hydro-electric station there with two 250 h.p. turbo-alternators, to which two more of the same size



Tinh-Tuc Mines—Mechanical Washing Shed and Annexes

will shortly be added. This supplies all the power required for working the mine, whither the current at 440 volts is carried by a 55-lb. aluminium cable.

Beausite Mine.

The Société des Mines d'Etain du Haut-Tonkin is working in the lower part of its concession deposits in old landslides and in the upper part similar but less rich deposits as well as soil made up by the disintegration of the granite with the small lodes, it contained.

The simple methods of working and the extreme low cost of the same have enabled this mine to keep going when so many others have had to close.

Various Deposits in the Pia-Wak Mountains.

The Ariane and Ganymede mines, recently closed, are in every way similar to their neighbor, the Beausite mine, just described.

The Société des Etains et Wolfram du Pia-Ouac Est are just keeping their mines on the northern and eastern slopes of this mountain (Robert and Minos mines) going.

IV.—Other Kinds of Deposits.

Herewith a few notes on deposits which have been prospected.

Argentiferous Lead at Ngan-Son.

Most of the zinc mines already mentioned contain lead ore which is more or less argentiferous, besides which lead has been located—very often associated with blende and iron pyrites—in at least forty places, in the neighborhood of most of which varying quantities of furnace slag has been found.

Of the old mines the most important and the best known—because they have been worked in recent years—are those which are to be found within a radius of three miles of the military post of Ngan-Son. This mining district is characterized by a mixture of crystalline limestone and old schists full of many faults marked by numerous Chinese workings, and the large heaps of slag, notably close to Ngan-Son, demonstrate the importance of the old workings. Further, the mine of Ngan-Son is mentioned in the annals of the court of Hue as being the most important silver mine in Tonkin. The attempt, made in 1889 to re-open the working failed on account of the insecurity of the district and the difficulties of transportation.

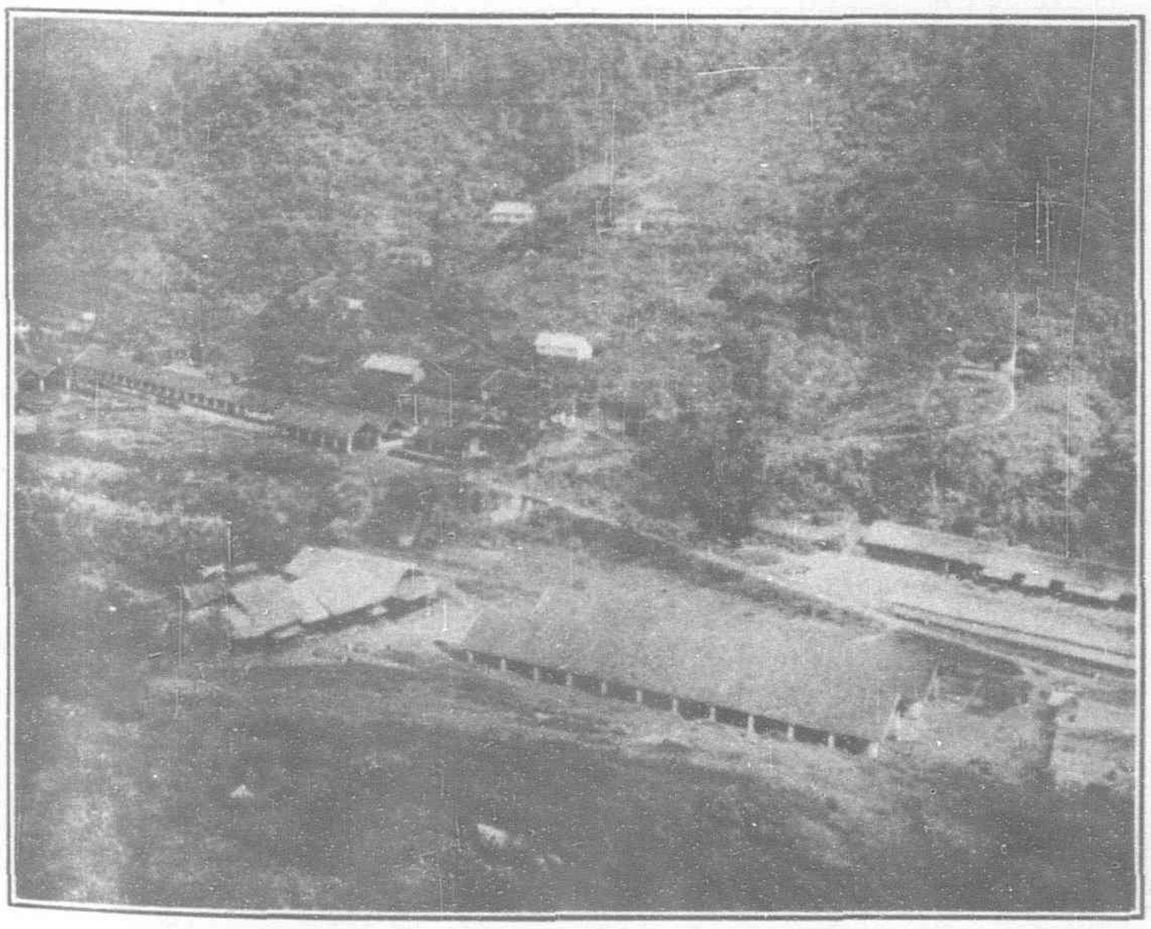
Since 1910 new and interesting discoveries have been made as the result of further searches. The ore has been found excessively rich in silver—in certain places up to 1 per cent. of the weight of lead—and is composed of galena blende, calamine, iron pyrites and accessorily of chalcopyrites, while the old workings are relatively very rich in blende, as the galena was carefully extracted, while the blende although containing as much as .3 per cent of silver per ton of zinc, was abandoned.

Copper.

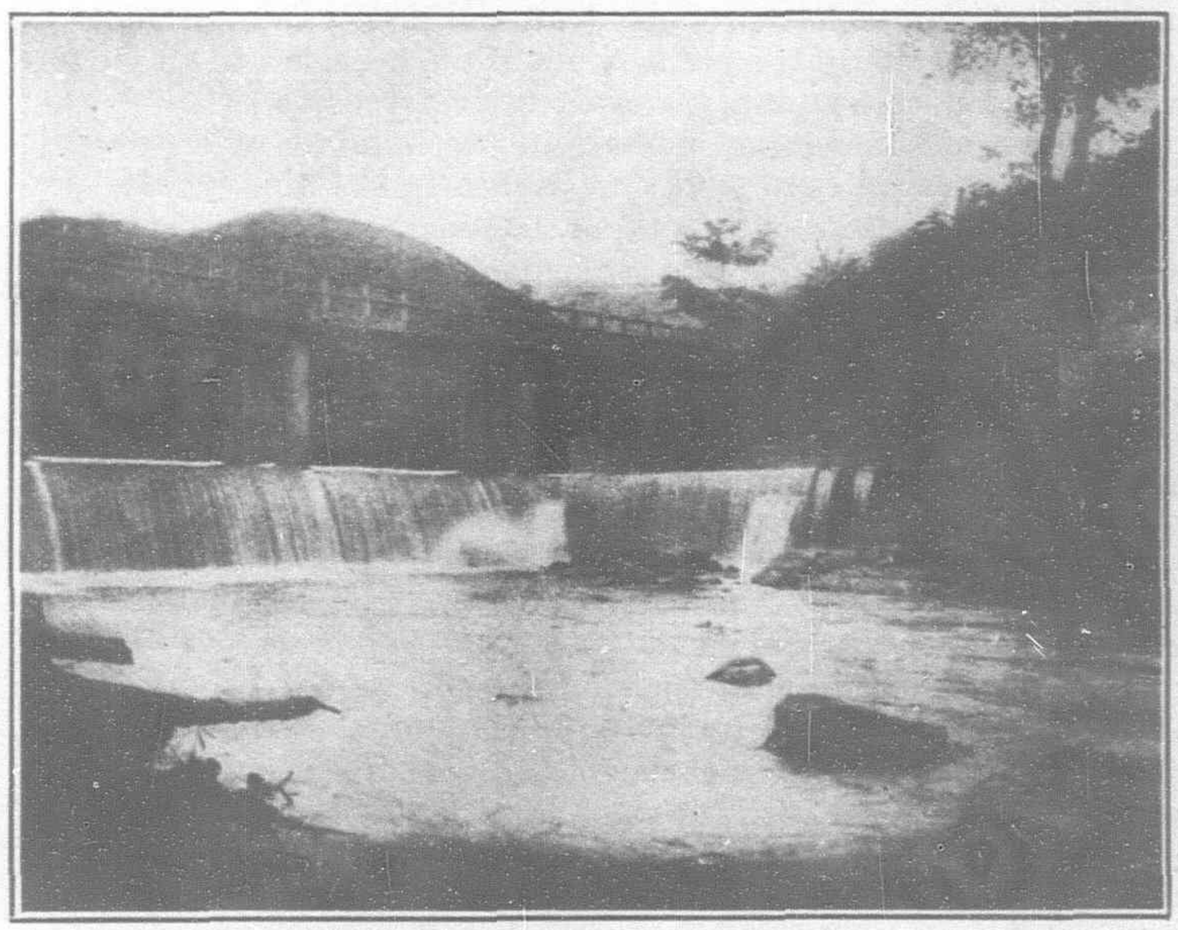
Copper in the form of lodes and lenticular deposits in malachite, azurite and phillipsite have been located, especially on the banks of the Black River and an attempt at working has been made at Van-Sai.

Iron.

There is abundance of iron in Tonkin, but so far it has been worked on a small scale only and almost wholly by the natives, so that the importance of the deposits is as yet not fully known.



Chodien Mines—Railway Station at Banthi



Ta-Sa Dam

Prospecting has been undertaken, however, in the immediate neighborhood of Thai-Nguyen (Molinham, Monaluong, Cuvan, etc.) where there appear to be large quantities of very rich and very pure ore (hematite and magnetite, which in view of their favorable situation are worthy of attention by western metallurgists.

The conditions for starting an iron industry in Tonkin appear at first sight extremely favorable.

While it is true that a small improvised 15-ton blast furnace was lighted at Haïphong in 1919, using coke or a mixture of anthracite and charcoal in order to reduce local iron ore and was abandoned in 1921 owing to the few hundreds of tons it produced costing too high, yet it is obvious that such an attempt on so small a scale was in the very nature of things bound to fail, as iron smelting must be worked on a large scale and by technical experts. Anyway the time seems to have arrived when this question may be re-opened.

The cutting of a canal, which will be shortly commenced, along the northern edge of the delta thus establishing communication between the Song-Cau below Thai-Nguyen and the Song-Thuong near Phu-Lang-Thoung will enable 250-ton barges to reach Thai-Nguyen and so form a cheap water-way between this mining district and Haïphong as well as with the anthracite coal-fields of Dong-Trieu and Along Bay and the important deposit of fire-clay at Trang-Bach.

This canal would pass close to the iron deposits above mentioned as they are mostly to be found to the east of Thai-Nguyen, while on the other hand a mining railway, from six to nine miles long, would suffice to bring from Thai-Nguyen the coal and coke of the Phan-Me, Lang-Cam, basin, which recent prospecting has shown to be several miles long and is only awaiting being made accessible and receiving the necessary capital in order to develop all necessary underground workings.

When it is realized that the district of Thai-Nguyen, as well as those of Dong-Trieu and the Along Bay contain any amount of limestone it is not difficult to conclude. subject of course to further prospecting, that local circumstances appear technically very favorable to the erection in one or more localities of blast furnaces using either coking coal or coke or anthracite and producing iron at remunerative prices.

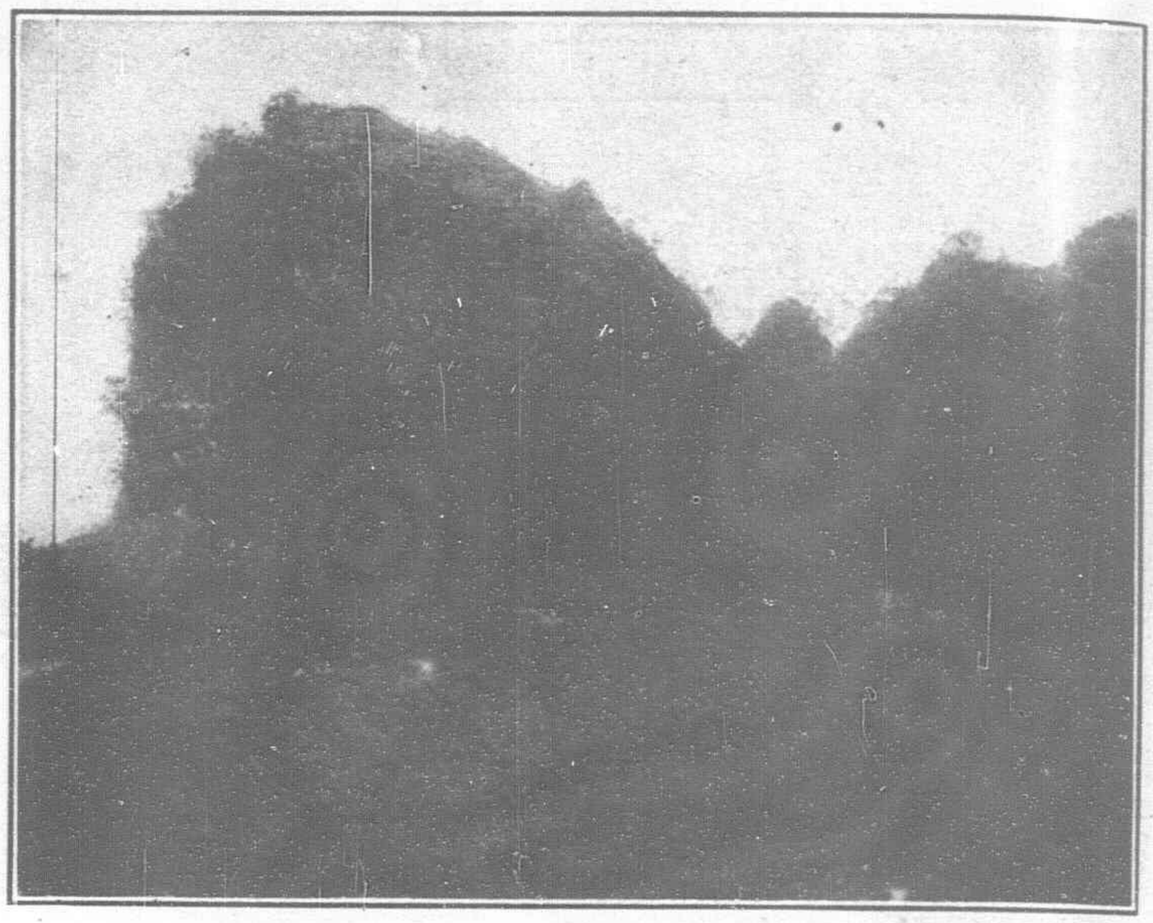
In fact the conditions for establishing such an industry appear to be better in Indo-China than in countries which have adopted European methods, such as Japan, which has to import a great deal of its iron ore—689,000 tons in 1920—or the Dutch Indies who although possessing plenty of good ore in the Celebes has no coal and is hesitating between importing foreign coke at high prices or reducing the ore by hydro-electric means thanks to the abundant water-power found in the island.

China possesses all the raw material for iron smelting but the present unsettled state of this country and the lack of expert engineers as well as their reluctance to learn from the foreigner makes it impossible to set up such a complicated industry. The plants at Hanyang and Hankow which produced in 1915 from their four blast furnaces and six Martin furnaces 140,000 tons of cast iron and 82,000 tons of steel had to close down in 1922, owing to reasons probably certainly as much economic as they were political. Engineers of repute have reported on the deplorable methods of work, which in spite of the plant being of the best, led to an output irregular and poor in quality and excessively costly.

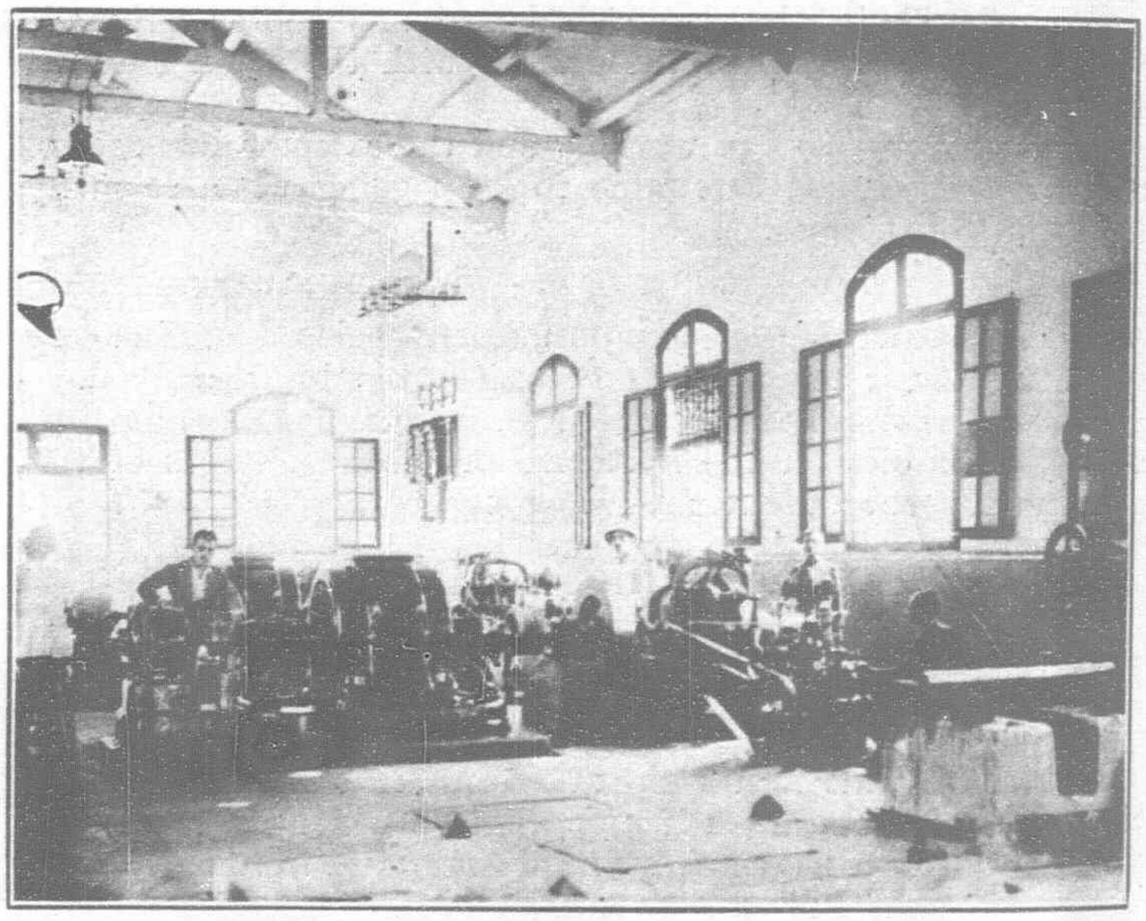
In spite of the coming increase in the building of railways it appears certain that steel works erected in Indo-China would have to look to foreign markets as well as the home one in order to keep going. There is, of course, the large market offered by China, with its teeming population and few railways, and on the other hand it is a known fact that for many years Japan has been seeking to obtain the iron which she lacks and that her emissaries have traveled over the whole of the Far East and the Malay archipelago and have even come to Hanoï with the proposal to work the Indo-Chinese iron mines and now, according to the *Génie Civil* of December 3, 1921, have passed a long contract with the Tata Iron and Steel Company in British India for a yearly supply of 100,000 tons of cast-iron.

With the possibility of such markets it should be easy for a Company to erect ironworks in Indo-China on a paying basis and without fearing that either through devoting itself to one class of material or to several with its attendant high cost it would fail to find a market for its products.

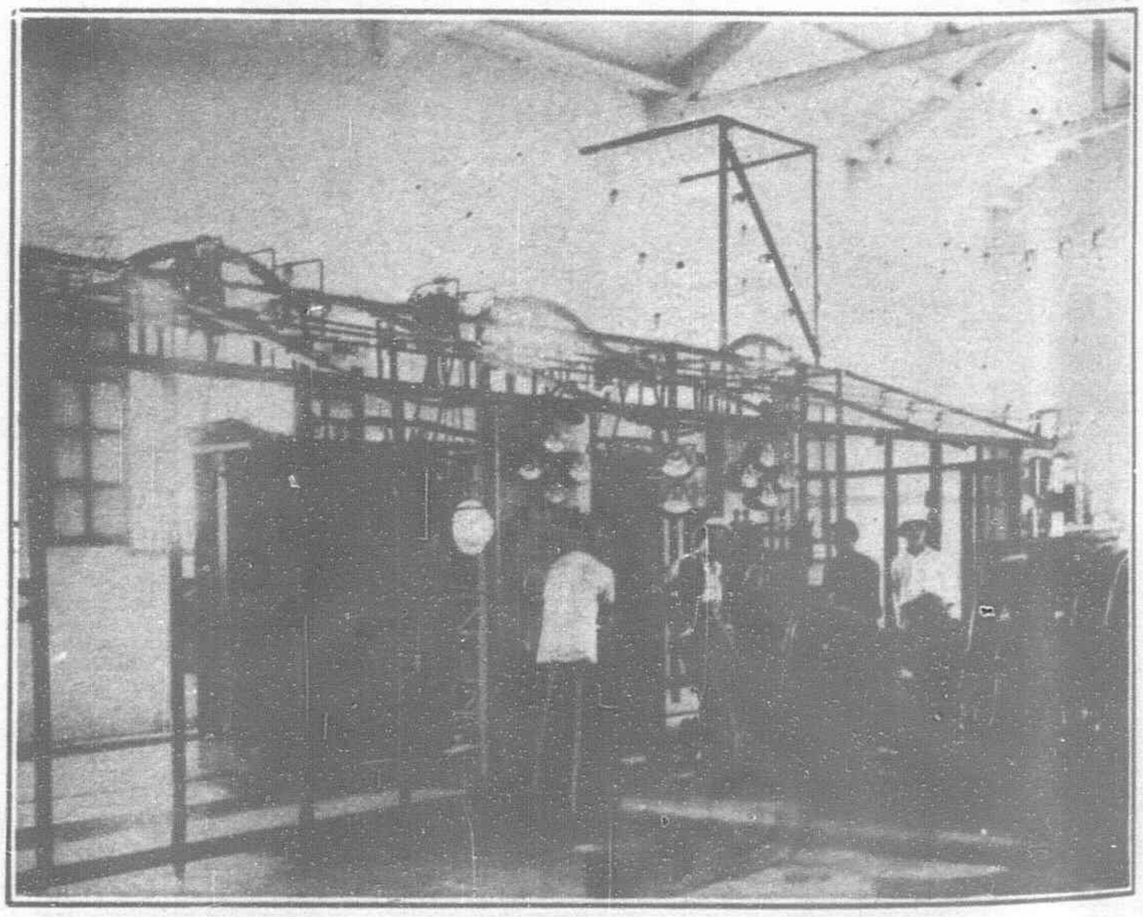
Our powerful French iron industry is naturally desirous of holding a good place in the Far Eastern market, but it would be outside the scope of this article to discuss under what conditions France could export the iron ore of Lorraine for instance. We can, however, once more call attention to the happy example of the Compagnie Minière et Métallurgique de l'Indochine who by treating the ore on



Chodien Mines—Showing Hillside Peppered with Mine Shafts

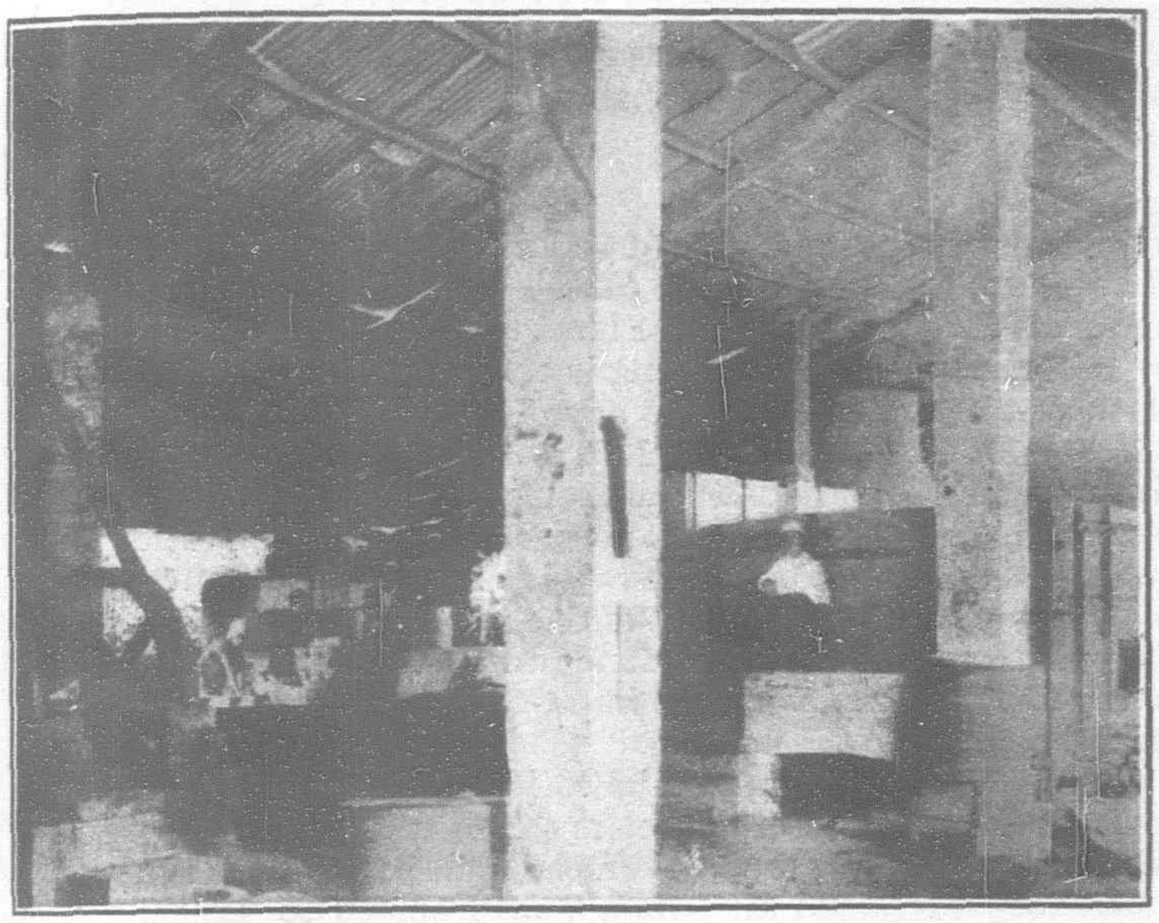


Tinh-Tuc Mine—Ta-Sa Hydro-electric Station

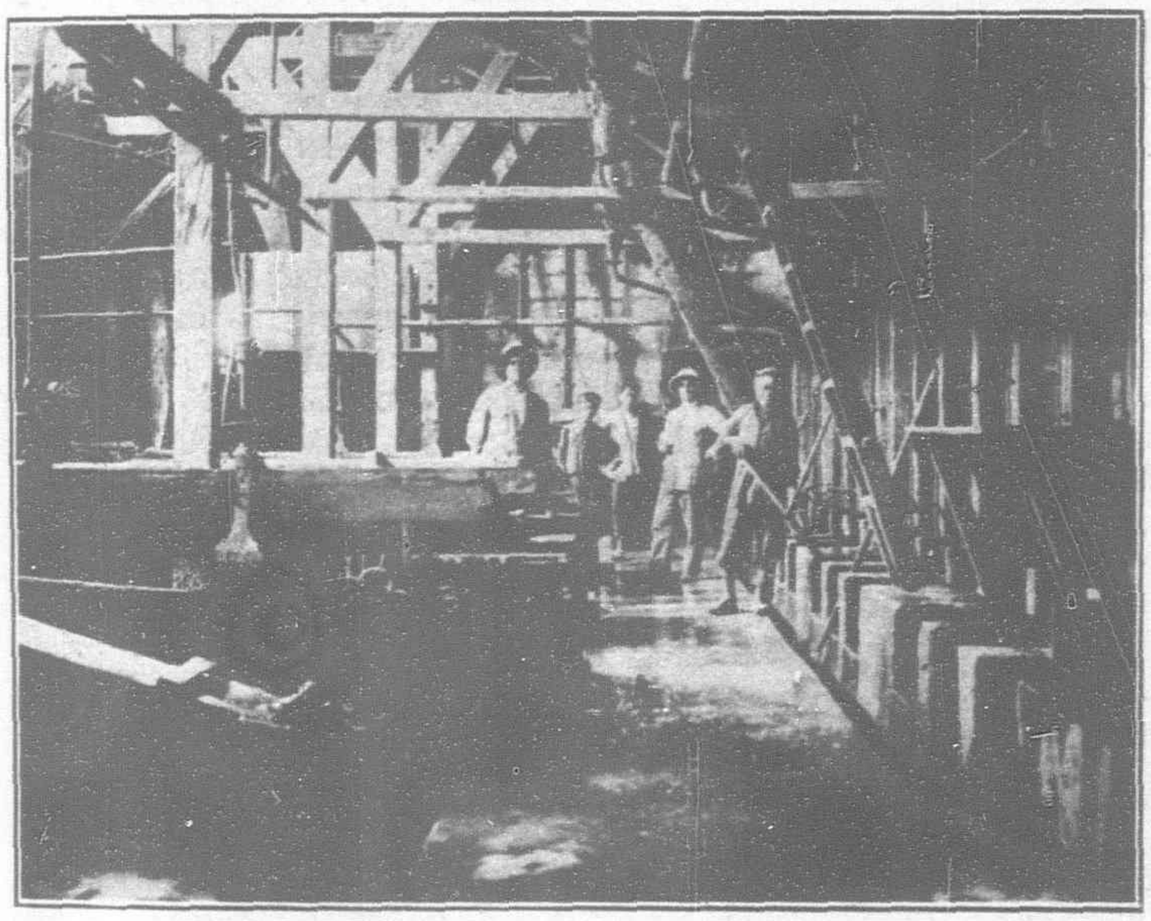


Tinh-Tuc Mines—Ta-Sa Hydro-electric Station Transformers

the spot instead of sending it raw to Europe increased the price of it in the European market before the war only by about 17 gold francs per ton of metal, that is to say about 3 per cent. of the price of the finished sheets on the European market, and in the Far Eastern market by only 117 gold francs or 17 per cent. In comparing the cost of iron imported from Europe with that produced in Indo-China there is an economy of 50 francs on rails, or 20 per cent. of their value. We would like our French ironmasters to carefully study the whole matter and thus form a basis from which it could be determined whether it would be better to import iron into Indo-China or to manufacture there, but this should be done immediately as the sooner a decision is arrived at, the better it will be for all concerned.



Tinh-Tuc Mines—A View of the Smelter at Ta-Sa



Tinh-Tuc Mines—Mechanical Washers

Tinh-Tuc Mines—Ta-Sa Smelters

Antimony.

Thanks to the high prices of this metal in the early years of the war the few deposits of this ore to be found in the district of Monkai to the north of Hongai in Tonkin enjoyed a short boom.

A foundry producing from one to two tons of regulus per day was improvised at Haiphong in 1916 thanks to the technical skill of local engineers, but the sudden drop in the price of this metal which supervened the same year dashed the legitimate hopes of the founders to the ground and necessitated the closing down of the works and the mines.

This ore is found either in the form of variously sized blocks of sulphide and oxyde of antimony scattered through the upper soil in uncertain deposits or in the form of lodes of quartzous gangue as at Monkai.

Gold.

(*a*) Auriferous Quartz.

Samples of auriferous quartz have been found at several places in the mountains of Tonkin, and in recent years attention has been called to the deposits of *Pac-Lang*, situated to the east of Ngan-Son, already mentioned in connection with silver, where several quartzous lodes are to be found, yielding at certain of their outcrops sufficient gold to justify further prospecting.

(*b*) Auriferous Alluvium.

Alluvial deposits of gold were formerly worked by the natives, but these have not been sufficiently studied to form any real estimate of their value. They are of three kinds :

(1) Existing river alluviums, such as those of the Song-Bac-Jiang, Song-Luc-Nam, Trang-Xa river, etc. ;

(2) Old alluvium at the bottom of certain valleys and in circular valleys in the limestone mountains, such as the deposits of Molu and Muong-Bu in the province of Sonla ;

(3) Old terraces, such as those of the Clear River and Red Rivers and of the Song Ky-Kong, near Langson.

Mercury.

Some years ago a few veins of cinnabar were found in the limestones 15 miles to the north and north-west of Ha-Jiang and mercury has been found just over the Chinese border.

The samples of cinnabar found in Tonkin are very good, but not sufficient is known as yet about these deposits to warrant any judgment being formed as to the possibilities of working them.

Phosphate of Lime.

Small deposits of phosphates and phosphated soil are to be found in many places in the limestone mountains of Tonkin, notably at Than-Moi and Langson in the province of Langson, where they fill cavities in the limestone. The smallness of each deposit is made up by their great quantity and the native growers are already appreciating these phosphates when, they have been duly calcined and ground, as they appear happily to correct the acidity of the tropical soil, and to probably also favor the assimilation of tricalcic phosphates.

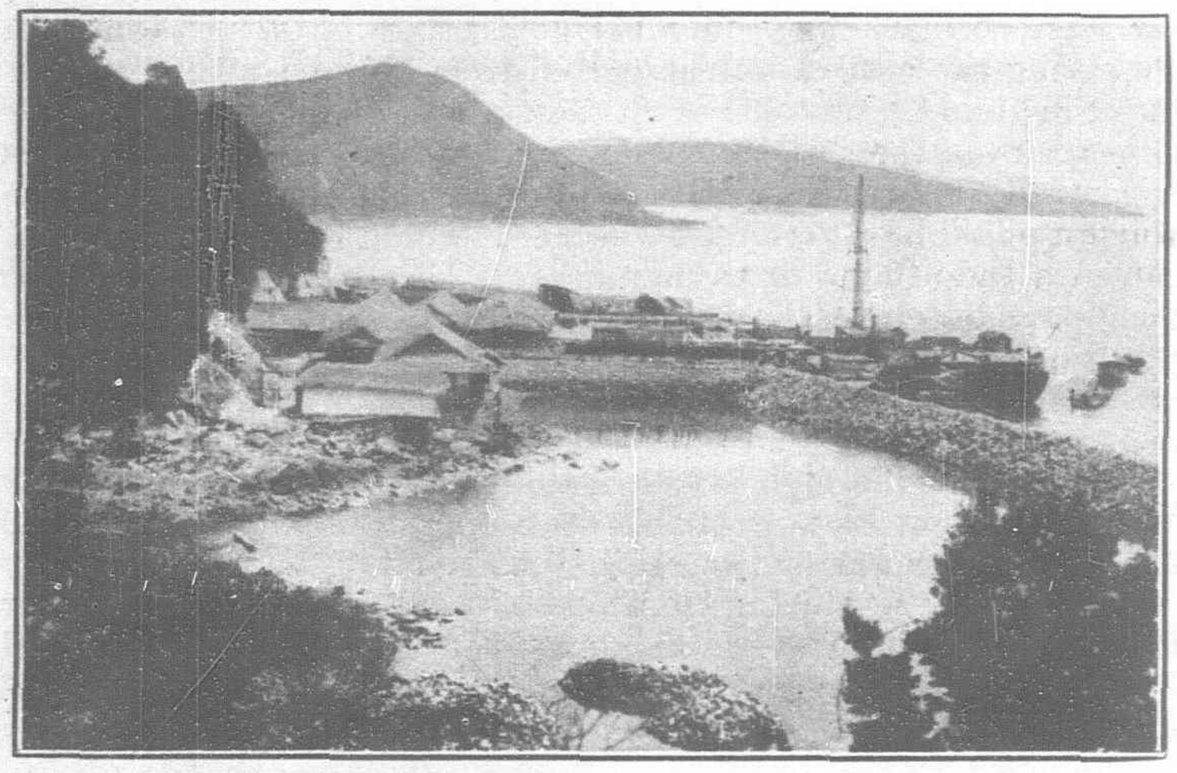
At Than-Moi certain caves are worked which yield a product containing after due preparation from 40 to 44 per cent. of tricalcic phosphates.

From 4,100 tons in 1919 the yield of raw phosphate rose to 12,000 tons in the following year, only to fall to 5,000 tons in 1921.

Graphite.

The attention of prospectors has been recently called to numerous deposits of graphite in flakes found in the gneiss and mica-schist on the left bank of the Red River above the delta.

One of these, at La Banniere, near Laokai has furnished, after due mechanical preparation, some very good samples and has such



Hongay Mines—Port of Champha, S. G. T. B. A. Works

an extent as to justify an attempt being made to work, it, in spite of the bad prices obtaining since the war.

MINES OF ANNAM.

I.—Coal.

Coal is to be found in Annam in the same geological formations as in Tonkin and in the form of non-bituminous and anthracite coal of the secondary period and lignite of the tertiary period.

Non-Bituminous Coal of the Secondary Period.

A huge coalfield is to be found to the south-east of Turan, which is worked at Nong-Son, but is considerably larger than the concession known by that name. This field is formed of synclinal and anticlinal folds of long wave length running chiefly from north-west to south-east and is about nine miles wide and shows signs of coal in its entire width. To the south-east of the Song Thu-Bong where it soon strikes the granite, superficial prospecting has revealed no signs of its being possible to work it. To the north of this river, however, without mentioning the Nong-Son colliery described below, this field offers near the pudding-stone rock of its north-eastern edge at Vinh-Phuoc on the Song Vu-Jia, a group of seams which are being prospected and have already revealed two outcrops, one of which is 31-ins. thick. The length of this field is as yet unknown; its north-eastern end plunges under the alluvium some 18 miles from Turan while in the south-west at over 30 miles from this town it enters a region inhabited by savage tribes and not yet explored geologically.

The non-bituminous coal of this field is analogous to that of Along Bay and the Dong-Trieu but with 6 per cent. of volatile matter.

The local market is very restricted as factories are almost unknown in Annam, the only notable customer being the hydraulic cement works of Lang-Tho, a few miles from Hue.

The Central Annam railways (107 miles are now open), and other industries prefer to use wood which will always be cheaper as long as it is found close to the railway, so that the Nong-Son collieries export most of their coal to China via Turan, where boats of low tonnage come to fetch it.

All the same at the moment when the working of this colliery was suspended the owners received local orders for several tens of thousands of tons which they were unable to satisfy. There is no doubt that new markets will be opened as soon as the railway is joined up with those of South-Annam and Cochin-China, by filling up the gap of about 335 miles between Turan and Nha. Trang already in course of construction*, for not only could the railway utilize some of this coal itself, if only for local use, but it would open new markets in the south of the colony. Near Turan two routes have been proposed for the new line, the more westerly of which though somewhat longer would offer greater security from floods, and the rivers could be more easily bridged than would be the case nearer their mouths. Should this be decided upon it would pass through a corner of the great coalfield, crossing the Song Vu-Jia eight miles below Vinh-Phuoc and the Song Tu-Bong at Kwang-Hue about nine miles below Nong-Son at a point which in spite of the silting up of the lower reaches of the river can be reached at all seasons by 10 to 15-ton sampans coming from the colliery.

NONG-SON COLLIERY.

Situation, etc.

This colliery is situated on the left of the Song Tu-Bong and close to the water about 40 miles south-south-west of Turan; to reach it an automobile road brings the traveler to Kwang-Hue (Jiao-Thuy) whence a sampan takes him for 9 miles up to the mine. The coal is brought to the river bank by a small railway and thence by water, as the Song Tu-Bong is connected with the Song Vinh-Dien, just before reaching the bay of Turan.

For fifteen years—from 1891 to 1906—this mine was attentively studied by various French companies† and it was then hoped—somewhat prematurely as it turned out—that the port of Turan would quickly develop. Anyway it seems that these companies devoted too large a proportion of their limited resources to works in the port, leaving insufficient funds to cover the intricate work of fitting up of the mine and the improvement of the means of transportation down to the port.

After the brankruptcy of the Société des Docks et des Houillères de Tourane the succeeding owners confined themselves to working the rising outcrop in the hills on the high bank of the river, from which they extracted an average of from 10 to 12,000 tons a year. In 1920 the output of 45 native workmen was only 6,000 tons, and in 1921 the colliery was closed down as the then private owner had not sufficient capital at his command to adequately continue the work.

Working Condition.

At Nong-Son a seam, of the Rhetian period, with an average thickness of a dozen yards of coal, has been worked on its outcrop, while some 200 yards to the east a 260-ft boring has been sunk to where it dips. Before, however, attempting to develop this colliery as it requires, it will be necessary to sink other borings so as to ascertain the extent of the dip, as well as to improve the means of transportation from the colliery according to the actual location of the main railway referred to above, as the silting up of the lower reach of the Song-Tu-Bong between Kwang-Hue and Kwang-Nam appears to make it impossible to reach Turan entirely by water.

*When this gap is closed, as well as that to the north of Dong-Ha, and from Saïgon to the Siamese frontier there will be direct railway communication between Bangkok to Langson in Tonkin and to Yunnan in China via Pnom-Penh, Saïgon, Turan and Hanoï.

†These companies were in the first instance the *Société Française des Houillères de Tourane*—a limited liability Company with a capital of one million francs—and the *Société des Docks et Houillères de Tourane*—a limited liability Company with a capital of three and a half million francs.

Hongay Mines—Native Village and the Great Rock

If, therefore, the silting up of the riverc annot be prevented and the railway takes the eastern route there will be no alternative to building an 18-mile mining branch line to the colliery.

Lignite of the Tertiary Period.

Among the coalfields known to exist in the northern provinces of Nghe-An and Thanh-Hoa mention may be made of those in the neighborhood of Cuarao, which produce a remarkably rich coal, but are situated 93 miles from the sea to which they are connected by the Song-Ka, a river but indifferently navigable, and that of Cho-Truc which is to be found close to the 33rd milestone of the Vinh and Tan-Ap section of the Trans-Indo-China railway now being constructed.

II.—Metallic Mines and Deposits.

Gold.

Bong-Mieu Mine.

(*a*) Situation.

At Bong Mieu Annam possesses the only important Indo-Chinese gold mine worked by Europeans. This mine which is in the centre of several similar deposits is to be found in the middle of the mountains of the Kwang-Nam province, some 60 miles to the south-south-east of Turan. A 19-mile carriage road runs from the mine to Tamky an interior port situated on the waterway—half river and half lagoon—which stretches for 50 miles along the coast of Annam between Turan and Phu-Binh—and is accessible to sampans of at least 10 tons.

(*b*) History.

The Bong-Mieu deposits were formerly worked on behalf of the Court of Hue, and were suspended, so it is said, some fifty years before the French in 1895 commenced prospecting.

Since then three companies, consisting of the same shareholders, have fitted up the mine and continued to work it with a tenacity worthy of a better success than what has been actually obtained. At the moment when the mine was just paying its way and that a proposed new chemical treatment of the ore, which would have improved the actual output of only 60 per cent. of metal, was on the point of being adopted, the termendous rise of gold prices, denoting the depreciation of the value of this metal as compared with other goods, started in the second half of the war and resulted in the closing down of so many gold mines all over the world. In Indo-China this meant a rise in the gold value of the piastre and consequently of labor, which in the winter of 1919-1920 had more than doubled its value in 1913. From 1918 this rise was over 60 per cent. and in the beginning of 1919 the Company had to liquidate. There is no doubt that had this not been the case the Bong-Mieu mine would have been to-day—when the piastre has almost regained its original value—one of the best equipped and flourishing mines of Indo-China ; anyway the machinery has been looked after so that it can be rapidly set going again.

(*c*) Methods of Working.

Several lodes have been worked, of which the principal, lying in micaschist and fairly regular is composed of iron pyrites and galena in a gangue of quartz and schist ; in the quartz itself the gold is found in sulphides and only in infinitesimal quantities.

These ores are transported to the works at Co-Bai by a ropeway $\frac{3}{4}$ mile long and capable of carrying 8 tons an hour. These works still exist and can normally treat 80 tons of ore per day and yield 30 tons of concentrated product. They contain three Dodge ore-crushers, five batteries of five stamps, pointed washing trays with a rising current of water, six Ferrari tables, ten cyanization basins and zinc cases for collecting the gold. The recovery of the gold from the tailings (15,000 tons containing 30 to 45 grains Troy to the ton) was being considered when work was stopped.

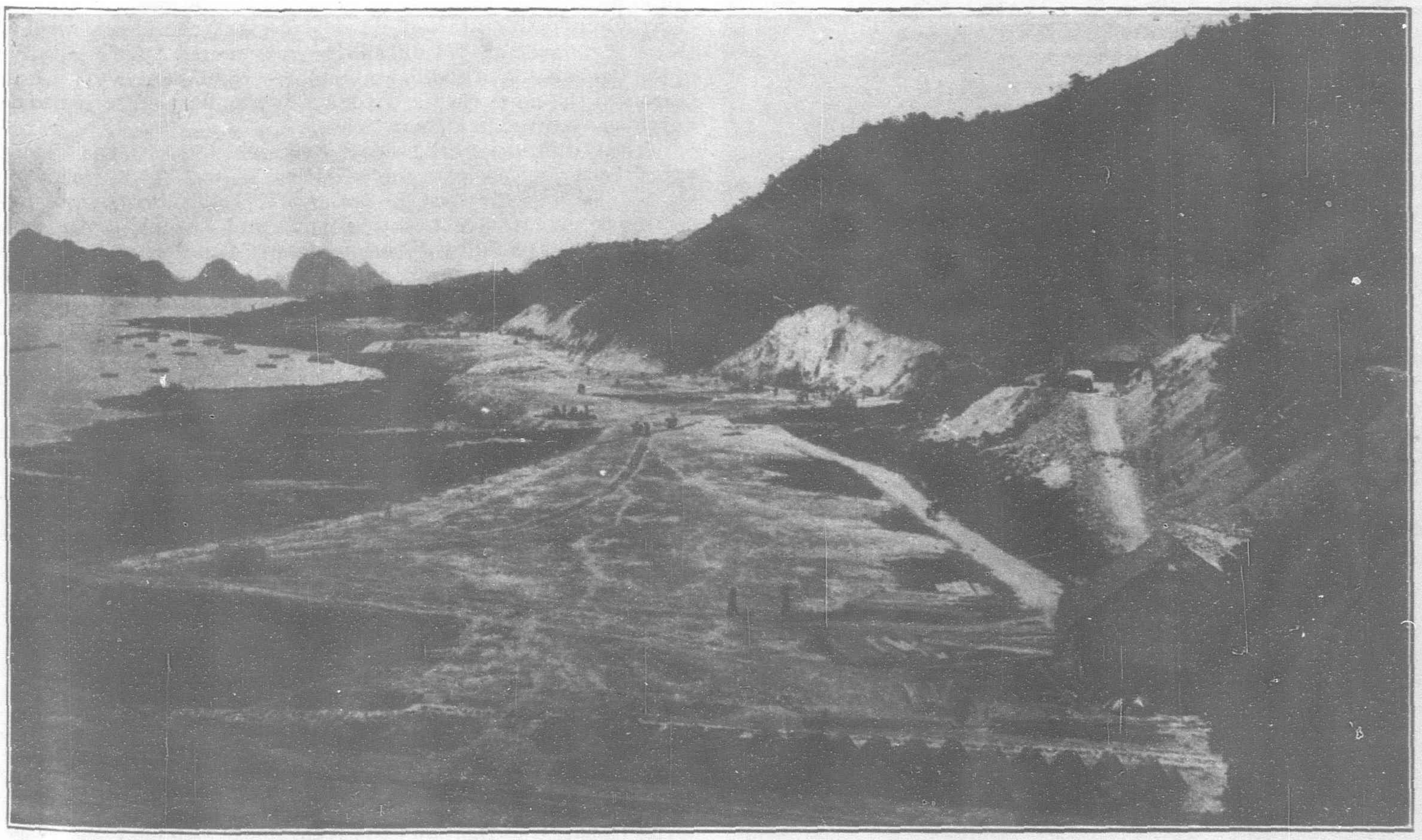
(*d*) Output.

The yearly average yield of the mine was 220-lbs. Avoirdupois in ingots containing 80 per cent. of fine gold and 20 per cent. of silver.

An electric central station run by a Neyret turbine of 150 h.p. and two 130 kw generators supplied power to the mines and the works.

Other Auriferous Deposits.

There is a deposit of sulphide and oxyde of antimony at 90 miles to the north-north-west of Vinh, consisting of great blocks



Hongay Mines—Port of Champha—View of Coast

scattered throughout the surface clays, which had been worked for antimony during the boom in this metal in the earlier years of the war. Later some of the quartz was found to contain a high percentage of gold and it is to be surmised that veins of this precious metal will be found in the neighborhood. but so far no prospecting has been undertaken.

At Kimson (Binh-Dinh) are to be found old gold mines, which traditionally are said to have been worked by the court of Annam for hundreds of years but were closed down about 1850.

Zinc, Lead and Similar Metals.

A few deposits are known to exist in northern and central Annam and though none of them appear as important as those of Tonkin the following may be mentioned: at Duo-Bo a lode of mixed sulphides of zinc, copper and iron in the form of a column of blende 33-ft. thick and 1,000-ft. long which it would be interesting to explore.

Iron and Similar Metals.

There are numerous rich and pure deposits of ironstone in Annam—many of which are worked by the natives—notably in the provinces which bordering on Tonkin, are better known to prospectors. Mention may be made of the Doanh-Xa deposit, six miles to the north of Than-Hoa composed of a seam of magnetite which supplied a thousand tons of ore to the blast-furnace at Haïphong.

In the province of Than-Hoa a deposit of oxyde of iron and manganese is being worked by a local factory of cheap mineral paint, while at Van-Am and Nui-Nua in the same province chrome iron ore has been found but is as yet unworked.

Finally titaniferous sands are to be found on the beach and sand-hills around the bay of camranh, and a company is being formed to work the same.

VARIOUS DEPOSITS.

Phosphate of Lime.

Deposits of phosphates of lime, analogous to thse in Tonkin, have been found in the provinces of Thanh-Hoa and Nghe-An, and the first of these two provinces sent in 1921 some, 4,400 tons of raw ore to Haïphong where it was ground.

Graphite.

From the Serevine mine at Hung-Nhuong in the province of Kwang-Ngai situated close to a navigable river and 22 miles from the sea, 7,450 tons of amorphous graphite were extracted in 1919 and exported without any further preparation to America. This did not pay and no further orders were received. The deposit consists of a series of pockets in the gneiss and micaschists and evidently contains a large amount of graphite, but before being put on the market it requires a very large amount of mechanical manipulation, and in view of the large stocks of this mineral which have accumulated in the world since the war it would not pay at the present moment to work this mine.

Mines of Laos.

Owing to the transportation of products from this country so far being practically confined to the Me-kong, with its difficult and slow navigation, as well as to the ladk of roads in the interior it is at present impossible to prospect there for metals other than the precious and rare ones. The opening of the road from Vinh to Takek in 1923 will place the long navigable reach of the central part of the Me-kong between Vientian and Savannakhek within one day's motor ride of the coast and within two days' reach of Hanoï and this should enable prospecting to be carried on much more easily.

Leaving on one side the few native workings for coal, iron, salt and precious stones (sapphires of medium quality at Houei-Sai on the Upper Me-kong) which are of purely local interest, gold and tin are the only metals which up to the present have seriously interested Europeans.

TIN.

Mines in the Basin of the Nam-Hin-Boun (Bantkua) and Neighborhood.

Situation.

The only known deposits of tin are those found at Bantakua, Bo-Neng, Na-Phan, etc., on the Nam-Paten river, a left-hand tributary of the Nam-Hin-Boum which in turn falls into the Me-kong from the left at Pak-Hin-Boum between Vientian and Takek. Ten-ton vessels can at all seasons reach the mouth of the Nam-Paten situated some 12 miles from the principal mine at Bantakua. When the water is high boats can sail up the Nam-Paten for another nine miles, and further, the company is improving the rough track which connects the mine with the mouth of the Nan-Paten, so as to make it passable at any rate during the dry season. It should thus be possible to take the necessary machinery (crushers, etc.) fairly easily up to the mine if the time of flood be taken to negotiate the Me-kong rapids (see article on Means of Communication).

Deposits and Methods of Working.

These deposits are formed by stanniferous limonites embedded in a clayey soil of vast extent, and it appears probable that the form of this ore is due to the disintegration of adjacent lodes, but such have not yet been discovered.

The natives who have exploited this deposit from time immemorial by sinking small shafts very carefully sift the ore at the pit head and have become expert in picking out the fine particles of cassiterite. This picked ore, containing from 5 to 12 per cent. of tin, is taken down to the village where it is crushed and "panned out" and then reduced by means of charcoal and bellows in little Chinese hearths. The metal thus obtained is from 96 to 97 per cent. fine. The yearly output of 10 to 15 tons is exported by foreign middlemen (Chinamen) into Siam where it is said to be largely used for weighting fishing nets.

Between 1899 and 1903 these deposits were prospected by the Société des Etains de Hin-Boum, who found that the cassiterite was very unequally distributed both in the limonite and the clay and that it would be necessary to treat the whole of the clay and its contents, which on an average contained from 1 to 4 per cent. metallic tin, as revealed by the borings made in this ground. Owing to the small size of the particles of cassiterite the mechanical operations required to extract this would be very considerable and to this fact, as well to the difficulties encountered by the members of the Commission of enquiry who took several months to get from Saïgon to the mine via the Me-kong, it was decided to not to do anything at any rate at that time.

These difficulties are becoming less and less with the opening up of better means of communication as well as by improved methods of concentrating the ore and, if further methodical prospecting be undertaken, it may be found that it would pay to work this deposit, especially if borings revealed richer ore below the surface. The work now being carried out here by the Société d'Etudes et d'Exploitation Minières de l'Indochine—a company established in 1921—may lead to interesting developments.

Gold.

A. Alluvial Deposits.

Since time immemorial the people of Laos have worked auriferous alluvial deposits, either in the beds of the rivers or in old and consolidated alluviums on the banks or in those still leaning against the flanks of the mountains. So far superficial and rapid prospecting has revealed but little gold to the cubic yard of earth, but it appears probable that the bed-rock has not yet been touched.

Auriferous sand and gravel accumulate in certain river beds, where rocky ledges form a natural dam, and such are to be found especially in the upper reaches of the Me-kong above Luang-Prabang, where a prospecting concession was granted in 1904, which, however, was eventually withdrawn as work was never commenced.

Auriferous old consolidated alluvial soils are the most frequent, and the natves work such at Dong-Kieu and at Hat-Kam below Vientian on the Me-kong as well as in the valleys of the Nam-San in the province of Vientian, of the Sebang-Hien in Savannakhèt, of the Houei Sang-Ngoi and the Khontha in Cammon and of the Ngam-Ngun in Vientian, etc. Provisional concessions have been

granted to French companies for all of the above deposits, but these rights have lapsed and in many cases no work even was done, and in one case—that of the Compagnie Minière et Industrielle—a dredger was with great difficulty and at great expense taken 50 miles up the Nam-Sane and was abandoned there, without any prospecting at all having been made as the company went into liquidation.

Auriferous alluvial soil on the sides of the mountains worked by the natives are to be found in the mountain group of Pou-Luong, between Pah-Beng and Xieng-Khon.

B. Veins.

The Société des Gisements Alluvionnaires has undertaken limited prospecting in several auriferous veins of pyritaceous quartz found in diorite at Bokham in Stung-Trenuand at Kontoum in Attopeg.

It may be conceded that the above deposits of gold should justify the undertaking of a systematic mineralogical survey of the country as soon as circumstances permit, nothing having as yet been done in this connection.

Mines of Cambodia.

Various Deposits.

Saphire Mines of Phailin.

General.

The only mine at work in Cambodia is the sapphire mine of Phailin near the Siamese frontier and about 50 miles to the south-west of Battambang and half-way to Chantabun. Some forty years ago Burmese hawkers related that they had seen blue stones in the hands of the natives who had no idea of their value and this story brought some of their fellow Burmans in search of gems to Phailin, and in this way the Burmese colony now engaged in exploiting this mine sprung up. Some twenty years ago this little colony was very flourishing under Siamese rule, and ten thousand inhabitants lived in comfort and had good times in spite of frequent epidemics of cholera, while many returned to their native land, their fortunes made. In those days sapphires of the first water were frequently found and they were sent by the grantee of the Siamese government concession to Chantabun where the principal native middlemen were located and thence to Bangkok, whence they were sent, still uncut, to London and Paris and were sold there, after being cut, as Siamese sapphires. Only local stones for local use were cut at Chantabun as the appliances were primitive and turned out poor work. Until recently, when the native authorities had to give way to the French, cuttng was prohibited at Phailin as this would have led to illicit traffic in the stones.

The Cambodian peasants were very glad to have this little colony among them as they sold rice and other foodstuffs to them at good prices and against ready cash.

Soon after the transfer of the province of Battamabng to Cambodia in 1907 the yield of the mines, which had been worked in a haphazard manner and without regard to either completely clearing the ground or taking note of previous workings, began ty fail and the population diminished. The long depression caused bo the war was the final blow and although work has not entirely stopped it is but a fraction of what it was, in spite of the fact that prospecting in virign soil is still rewarded by good finds.

It may be noted that the political change had no effect on the trade in sapphires which were still sent into Siam, and the Paris jewellers made no attempt to obtain them direct. For a long time this Burmese colony retained its political semi-independence and it was only during the war that the chief of the community relinquished his powers into the hands of the French, and even then the special unwritten customs as to the division of the land and the distribution of the water used in breaking down the soil and cleaning the stones, the partition of the stones between the owners, workers and canal proprietors, payment of the mining fees, etc., were as far as possible respected and this little mining community was exempted from the mining regulations obtaining in the rest of the union.

Deposits and Working.

These gems are found from six to ten feet deep embedded in a stratum of alluvial clay resting on crystalline rocks of various kinds. It is supposed that they are of basaltic origin, but as, so far, no sapphires have been found in this rock, more especially found near the richest soil, this hypothesis remains unproved.

The only stones of commercial value are the sapphires. Rubies, of a violet red colour but no sapphires are found half-way between Phailin and Chantabun, especially at Bonavon in Siam. The few rubies met with at Phailin are inferior to the blood-red Burmese stone.

Output.

In 1920 there was a slight rise in exported stones, the *verified* yield in this year being 3,413 carats of an estimated value of 360,000 frs. as against 2,853 carats and 215,000 frs. in 1919.

Iron.

The deposit of Phnom-Dek, 43 miles to the north of Kompong-Thom on the river of the same name navigable when the water is high, is exploited by the primitive tribe of Khouys who make tools of high repute.

Fuchs, who visited this spot describes the deposit in his "Memoir on the ore deposits of Indo-China" (*Annales des Mines*, 1882) as a great mass of rich and pure ore crossing a hill of eruptive rocks. This has been confirmed, but without bringing out any new facts, by poor superficial prospecting carried out since by a company who proposed to erect electric furnaces there, obtaining their power from the falls of Khong on the Me-Kong, some 90 miles distant, and using charcoal from the Cambodian forests.

Phosphate of Lime.

Deposits of phosphates similar to those in Tonkin have been discovered in the limestone mountains of the provinces of Kampot and Battambang. Those in the neighborhood of Tuk Meas near Kep in the province of Kampot lie close to a water-way accessible to large junks, and preliminary works undertaken in 1919 yielded 2,950 tons of raw phosphates. Nothing has yet been done with those near Battambang.

Gold Occurrences in the Zeya Central Mining Area of Easteran Siberia

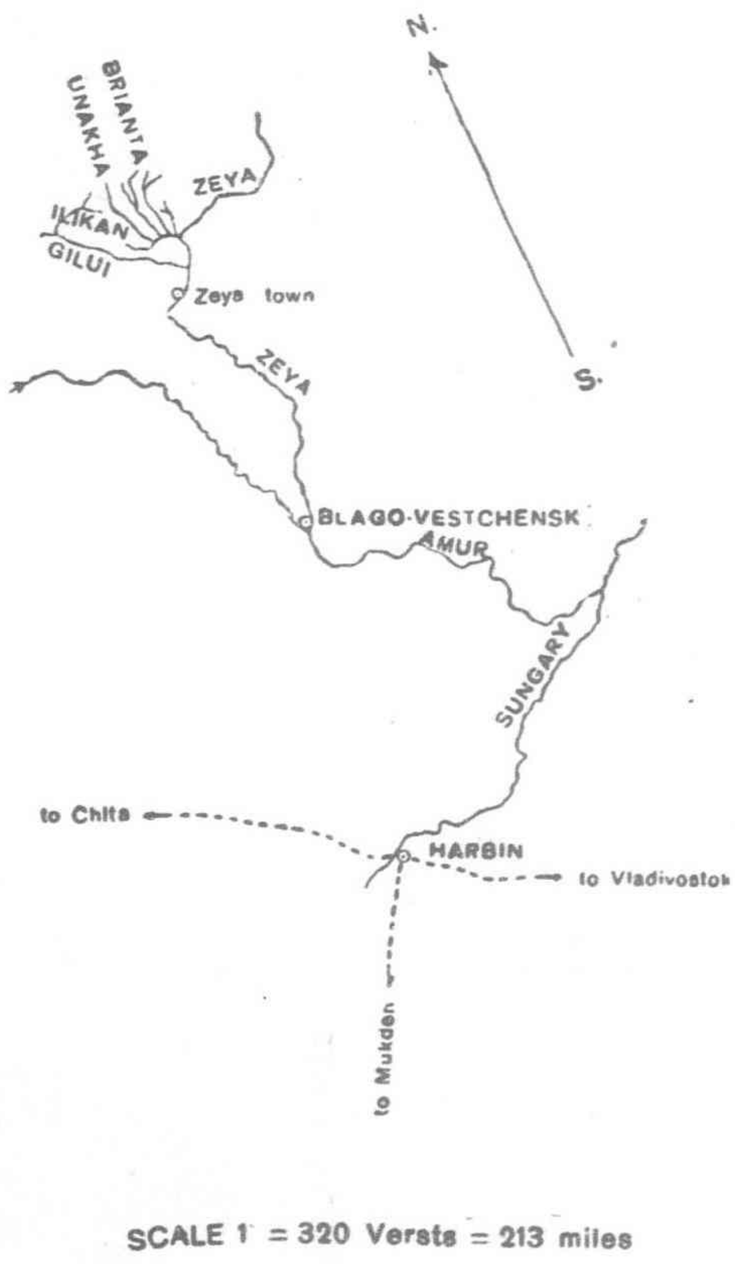
Paper read before the Chinese Institution of Mining and Metullurgy

By Y. T. Eve

THIS is a short general description, with conclusions arrived at after a careful study of the district.

About two years ago I arrived in Peking in charge of an expedition whose object was to explore the mineral resources of northern Mongolia between Ta-na-oula range and the Sayan mountains. The troubles in Mongolia prevented me from carrying out the original plan, and subsequent events influenced me to propose the change of that plan to an investigation of the possibilities of gold mining in Eastern Siberia to the north of the Amur River. For the last year I was there exploring and prospecting for gold in the area between the rivers Gilui and Brianta (see map).

It is not the object of this article to describe the political, etc., conditions of life in Russia. It is sufficient to say only that during my stay there I was treated with the utmost courtesy by the officials in charge, who on the whole seemed to me a quiet and efficient lot. I had not the slightest trouble with the workmen whom we employed. The same applies to the owners of the mines and other representatives of bourgeoisie who came back and are helping at the present moment to rebuild new Russia.



The area in question is situated in the corner between the Gilui range of hills and the Zeya River, and is bounded on other sides by the River Brianta and its affluents. It is a slightly undulating country, slowly rising from the Zeya divide of the Gilui range, which drops abruptly in step slopes towards the Gilui itself. The valleys of Brianta (extreme lower part excepted) and its affluents are narrow, deep-cut, and rocky. The gradient is high, and there are many dangerous rapids. The surface of the land consists of frozen marshes, with dense pine and larch forests. The prevalent rocks are gneiss and granite. The first one is predominant, and it is cut frequently, very frequently in some places, by dikes, etc., of diorite, granite, porphyrite, pegmatite, and aplite. Amongst the minerals the predominance of amphybole is noticeable, especially in certain areas of contact and in gneisses. The contacts are well formed, and extend widely in the neighboring rocks. Numerous lenses of quartz are frequently met with, but in no case have I traced the presence of a more or less extensive reef. Quartz was tested from many lenses, and was found in most cases to contain some gold. This and general conditions above described undoubtedly show us the possibility of gold being present and possibly partially collected from the area in question by the agents of nature, and deposited, as naturally would be the case, in certain alluvials.

In the area described above we find alluvials apparently of two distinctly separated ages. One, much the older, is represented by a belt of gravels situated high and dry on the hills between the rivers Gilui-Zeya-Brianta-Unakha-Jlikan. Another, a modern one, is represented by gravels, etc., of the existing rivers and creeks. There is difference in composition between older and newer gravels. The first are composed mostly of gneiss and quartz, the second of the rocks described above without any special predominance of quartz or gneiss. It is a question for further study to decide whether both gravels are derived from the same rocks or not, and whether the present difference in composition is due to the decomposition of the older ones. The newer gravels are developed rather poorly. The reason for this, in my opinion, is that the country has begun only very recently to free itself from the grip of the north.

Apparently all alluvials were swept away by the advance of the ice during the last glacial period, all, that is to say, except such as were protected by the barrier similar to the Gilui mountains. Since then the country has been frozen. Under such conditions the formation of the new alluvials or soil could proceed but very slowly. We see everywhere proofs of the accuracy of such a statement. We see it in the thin blanket of soil ; in the courses of rivers, which seem to change their direction in true frozen manner ; we see it in the composition of the present gravels as related to the neighboring rocks ; we see it also in the distribution of gold.

The belt of older gravels is drained by the rivers Zeya and Unakha with their affluents. The area affected by them is large ; the heads and valleys of the creek are well developed. In many places the bedrock is already exposed. In many places the old gravel terraces still remain of considerable thickness, sometimes up to 50-90-ft. and even more.

This is the area the mines of which, though discovered at the end of last century, were still working at full speed at the outbreak of the revolution. A number of small and big Russian companies (foreigners were excluded) were working, employing thousands of men. Roads were built, telephone lines connected practically all mines of importance. The country was full of life. It is silent and more than half dead now.

The mines of the area in question were, in a great many cases, exceptionally rich. It is sufficient to mention, for instance, a creek Djalon, which on about five miles of its course yielded (officially registered) over 30 tons of gold.

Curiously enough all this system of small and large creeks was worked only in narrow strips along the side of the course of existing creeks, and no attention (with a few exceptions) was ever paid to the sides of the valleys or the gravel terraces themselves, and only very recently, to the great astonishment of all concerned, it was discovered that these terraces also contain a workable quantity of gold.

The reason for so remarkable an oversight lies possibly in the race to find rich mines, and rich mines only. This is one reason. Another is that the old working methods were extremely crude and primitive. Hand labor was employed for the most part, and only in a very few cases do we find attempts to use up-to-date machinery. And this was in country with good grades, abundance of water, cheap timber, and facilities of transport as offered by steamer navigation on the River Zeya. Absence of adequate machinery was impeding, of course, the work on low marshy grounds at the mouth of some creeks also.

The best values were mostly found in the areas where creeks were crossing the old terraces or a short distance below them. Only very light gold (something from 400 and upwards colors per lc.) had time, apparently, to be transported any considerable distance at all, but, on account of the peculiar climatic conditions (frozen ground, shortness of summer, rivers freezing right down to the bottom in winter, etc.), was scattered on a long distance without forming any deposit of sufficient values, except some pockets or rich fringes on certain projecting sides of the curves of the rivers. The best example is offered by the Unakha-Brianta systems. The Unakha, by itself, does not cut through the old gravels. It skirts them, and receives the majority of creeks which do cut through them. On the average it is poorer than its affluents. The gold is much finer, and this state of affairs is best exemplified at its lower reaches near the junction with the Brianta. After junction, the gold values drop and the pay streak begins to be very patchy. Repeated attempts to trace any pay streak in the valley of the Lower Unakha gave negative results.

The pay streak seems to be limited to the present course of the river only, with few narrow variations to one or another side.

On the lower part of the Unakha a small dredge (5½ cbf. nominal) has been working since 1912. It is the only dredge in the whole Zeya mining district.

This dredge was not built specially for the conditions of the Unakha, or for the north in general. Nevertheless, it has worked with great success.

I went up the Brianta for about 200 miles. I saw many small creeks which yielded no values at all. I saw a few which gave average and even good values. The good ones were practically worked out. I have not seen any signs of older gravels there, and the gold of the creeks was apparently derived from the neighboring rocks. All mines found there were small mines, and the Brianta itself carries no values worth consideration.

Everything seems to point one way. There were big rivers in some far-away district. Their carrying capacity was great. They formed big gravel deposits, with a workable quantity of gold. Such deposits, if cut through by creeks, gave mostly rich mines. These deposits were partially carried away by the advance of ice.

Then there are modern rivers, with their small carrying capacity, and shallow gravels derived from the surrounding country at a very recent age. These rivers or creeks are a succession of poor men's camps at the utmost.

World Electric Consumption

THE consumption of electrical current throughout the world has been carefully and picturesquely tabulated by the *Scientific American*, and in the June issue of that publication a most interesting diagram has been published. Here are some of the outstanding features of the portrayal :—

In total annual current consumption of the nations wherein a billion kilowatt hours or more is used America takes first position by a stupendous measure. The gross consumption in the United States for all purposes is 49,802,000,000 kilowatt hours. Next in rank comes Germany with 8,000,000,000. Japan with 6,925,000,000 stands third, and Great Britain with 6,400,000,000 fourth. Then in order of rank Canada, Italy, Switzerland, Sweden, Norway, South Africa and Spain.

But in the consumption of current per *capita* of the population there is a very general alteration of the standing of the nations. Switzerland tops the roll with an annual average of 700 kilowatt hours per Swiss. Canada consumes 612 kilowatt hours per *capita* per annum and holds second place, and third comes Norway with 493 kilowatt hours consumed for each Norwegian. In this list America, with 472 kilowatt hours of per *capita* consumption, stands fourth, and after us come Sweden, South Africa, France, Germany, Great Britain and Chili, all of which use more than 125 kilowatt hours per person a year.

In the percentage of dwellings with electric light installation there is another alteration of order. Here Canada takes first place with 38.3 per cent. of her homes illuminated by incandescent bulbs. The United States holds second place with 36.8 per cent. of our domiciles electrically lighted. Third place falls to New Zealand with 30.8 per cent. of homes thus lighted. Fourth place goes to Japan with 29.9 per cent., and fifth to Denmark by the very narrowest of margins, for 29.8 per cent. of the Danes eat their supper under the glare of Mr. Edison's invention. Thereafter come Switzerland, Norway, Belgium, Australia, Sweden and Great Britain, all of which have more than 15 per cent. of their homes wired, and the rest of the world trails after with smaller lighting equipment.